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REPORT FOR CONSULTATION ON THE FOUR CORNERS INTERSTATE AIR QUALITY CONTROL REGION (ARIZONA-COLORADO-NEW MEXICO-UTAH)

National Air Pollution Control Administration
Washington, D.C.

October 1970

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FOUR CORNERS

INTERSTATE AIR QUALITY CONTROL REGION

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U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
National Air Pollution Control Administration
October 1970

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PREFACE

The Clean Air Act, as amended, directs the Secretary of Health, Education, and Welfare to designate "air quality control regions" to provide a basis for the adoption of regional air quality standards and the implementation of those standards. The Act stipulates that the designation of a region shall be preceded by consultation with appropriate State and local authorities. This report is intended to provide the basic background information needed for the consultation. It proposes boundaries for the Four Corners Interstate Air Quality Control Region and discusses the factors which are the basis of the proposed boundaries.

The Region* boundaries proposed in this report remain subject to revisions suggested during consultation with State and local authorities. Formal designation of the Region will be made only after a careful review of all opinions and suggestions submitted during the consultation process.

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*For the purposes of this report, the word "region", when capitalized, will refer to the Four Corners Interstate Air Quality Control Region.

President Nixon emphasized in his February 10, 1970, Environmental Message that designation of interstate air quality control regions should be greatly accelerated. Therefore, the National Air Pollution Control Administration (NAPCA) has placed high priority on the new approach to accelerated regional designation in interstate problem areas.

The National Air Pollution Control Administration appreciates assistance received from the States of Arizona, Colorado, New Mexico and Utah, and the local governments and planning agencies in the area.

Correspondence from the States of New Mexico, Utah and Colorado to NAPCA led to the proposal of air quality control region boundaries in the Four Corners area. The principal air pollution concern in the area revolves around existing and proposed electric power-generating stations and the desire to protect an especially scenic and natural environment from adverse pollution. The proposed Region is unique from an air pollution standpoint as it has a very low population density and will cover a larger area than any previously designated or proposed air quality control region within the continental United States and local agencies and Indian tribes have jurisdiction within the area.

Governor David F. Cargo of New Mexico requested on November 25, 1969, that the Secretary, Department of Health,

Education, and Welfare designate an interstate air quality control region involving the Four Corners area. Governor Cargo's request was a welcome response to the edict of the Clean Air Act that "the prevention and abatement of air pollution at its source is the primary responsibility of State and local governments." Indeed, success of the Federal program to control air pollution rests in no small part on the type of State initiative illustrated by Governor Cargo.

On July 30, 1970, a briefing meeting was conducted in Santa Fe, New Mexico, prior to preparing this report. At this meeting, representatives of the National Air Pollution Control Administration delineated the type of information needed for preparation of the consultation report and solicited the cooperation of agencies having beneficial information. Participants invited to this planning meeting included representatives of the National Air Pollution Control Administration; States of Colorado, New Mexico, Arizona and Utah; the Four Corners Regional Planning Commission; the Bureau of Indian Health, Office of Environmental Health; the Hopi, Navajo and Ute Indian Tribal Councils; and the additional Federal agencies; Bureau of Reclamation, National Park Service and the U. S. Forest Service. During the Santa Fe meeting, NAPCA also proposed boundaries for the initial study area. Based upon a statement read for Governor Rampton of Utah, the study area was expanded to include more than proposed by

NAPCA. Later correspondence from the Colorado Air Pollution Control Commission requested two additional counties be included in the study area. The original study area boundaries are shown in Figure 1 of this report.

Concern over the actual and potential air pollution problem in the study area has been substantial. Citizen groups have been active in an effort to maximize air pollution control efforts and to prevent deterioration of the area's environment. Many news articles have reported on the air pollution situation and what is, or is not, being done about it. In requesting a Federal air quality control region in the Four Corners area, Governor Rampton identified one of the major concerns from the view of interstate-economic consideration. His statement included the following observation:

> "...The second point, which is of far greater personal concern, arises where separate and distinct political jurisdictions such as states compete for anticipated industrial development projects and are tempted to make the stringency, or rather lack of stringency of air pollution control regulations one of the negotiating points to use in attracting such industry. The potential for such detrimental competition now exists in the four corners area involving the states of Arizona, Colorado, New Mexico, and Utah. Here the development of several major coal fired, electrical generating plants is projected to meet the rapidly expanding power needs of Southern California and the Pacific Southwest. It would be unfortunate if the relative severity of air pollution control regulations existing between the states could be considered by the developers of these projects as a major factor in deciding where to locate a power plant, or any other industrial development, for that matter..."

The intergovernmental relationships required affect Federal, local and Indian jurisdictions as well as the involved States. Of course the development of industrial and tourism potential in the area are very important to the citizens of the area. Development of severe localized air pollution problems and the reduction of visibility are matters of concern. However varied in approach, all parties involved in the Four Corners study area have expressed a mutual desire for the attainment and maintenance of a clean environment.

INTRODUCTION

THE REGIONAL APPROACH

Air pollution in the United States is a regional problem which frequently extends across governmental boundaries. Since air pollution problems are rarely confined to any single municipality or county, and are often not confined within a single State, successful control requires coordinated planning, standard setting, and enforcement by the several political jurisdictions which share a common problem. To date, State and local governments across the Nation have only begun to develop a regional approach to air pollution control.

The Clean Air Act, as amended, provides a regional approach which depends upon coordination and cooperation among all levels of government--municipal, county, State, and Federal. To set in motion the machinery for regional air pollution control, the Department of Health, Education, and Welfare designates air quality control regions (following consultation with State and local officials), issues air quality criteria, and publishes reports on control techniques. The designation of region boundaries indicates which State and local jurisdictions will be involved in a regional air pollution control effort. The air

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quality criteria indicates the extent to which various concentrations of air pollutants are harmful to health and damaging to property. The reports on control techniques provide information on the costs and effectiveness of various techniques for controlling air pollutant emissions.

After the Department of Health, Education, and Welfare completes these initial steps, State governments develop air quality standards and plans for implementation of such standards within the boundaries of designated air quality control regions. An air quality standard for a region defines the desired limit of concentration of a pollutant in its ambient air. It represents the level of air quality which the regional control program will attempt to achieve. An implementation plan is a blueprint of the steps which will be taken to attain chosen regional air quality standards within a reasonable time. The Clean Air Act requires that within 90 days after the Secretary of Health, Education, and Welfare has designated the region, State Governors must submit letters indicating that they intend to set air quality standards for those pollutants for which criteria and control technology documents have been issued. They have an additional 180 days to set the standards. The procedure for setting standards includes a public hearing which allows residents of a region to express their views concerning the proposed standards. The Governors are required

to submit to the Secretary, within an additional 180 days, plans for the implementation of the standards which have been adopted (see Figure 1).

DESIGNATION OF AIR QUALITY CONTROL REGIONS

Designation of an air quality control region is one of the first steps in the regional approach to air pollution control. Section 107(a)(2) of the Clean Air Act, as amended, directs the Secretary, Department of Health, Education, and Welfare to make such designations. The portions of the section relevant to this discussion state:

> " ... The Secretary, after consultation with appropriate State and local authorities shall... designate air quality control regions based on jurisdictional boundaries, urban-industrial concentrations, and other factors including atmospheric areas necessary to provide adequate implementation of air quality standards. The Secretary may ... revise the designation of such regions ... the Secretary shall immediately notify the Governor or Governors of the affected State or States of such designation."

The language suggests a number of objectives which are important in determining how large an air quality control region should be. Basically, these can be divided into three separate categories.

First, a region should be self-contained with respect to air pollution sources and receptors. In other words, a region

HEW DESIGNATES AIR QUALITY CONTROL REGIONS.
HEW DEVELOPS AND PUBLISHES AIR QUALITY CRITERIA BASED ON SCIENTIFIC EVIDENCE OF AIR POLLUTION EFFECTS.
HEW PREPARES AND PUBLISHES REPORTS ON AVAILABLE CONTROL TECHNIQUES
90 DAYS
STATES INDICATE THEIR INTENT TO SET STANDARDS.
(PUBLIC HEARINGS)
180 DAYS
STATES SET AIR QUALITY STANDARDS FOR THE AIR QUALITY CONTROL REGIONS.
STATES SUBMIT STANDARDS FOR HEW REVIEW.
180 DAYS
STATES ESTABLISH COMPREHENSIVE PLANS FOR IMPLEMENTING AIR QUALITY STANDARDS.
STATES SUBMIT IMPLEMENTATION PLANS FOR HEW REVIEW.
STATES ACT TO CONTROL AIR POLLUTION IN ACCORDANCE WITH AIR QUALITY STANDARDS AND PLANS FOR IMPLEMENTATION.

FIGURE 1 - Flow Diagram for Action to Control Air Pollution on a Regional Basis, under the Air Quality Act

should include most of the important sources in the area as well as most of the land area affected by those sources. Unfortunately, since air pollutants can travel long distances, it is impractical if not impossible to delineate regions which are completely self-contained and the air over a region will usually have at least trace amounts of pollutants from external sources. The dividing line between "important influence" and "trace effect" will be a matter of judgment. The judgment should be based on estimates of the impact a source has upon a region and the level of pollution to which receptors are subjected.

The second general objective requires that region boundaries be designed not only to meet present adverse conditions, but also to anticipate future conditions and to preserve high quality environments where they now exist. This objective requires careful consideration of environmental resources unique to the existing area development plans, expected population growth, and projected industrial expansion. Such considerations should result in the designation of regions which will contain the sources and receptors of regional air pollution for a number of years to come. Of course, regional boundaries need not be permanently fixed, once designated. Boundaries should be reviewed periodically and altered when changing conditions warrant

readjustment.

The third objective is that region boundaries should be compatible with and even foster unified and cooperative governmental administration of the air resource throughout the region. Air pollution is a regional problem which often extends across several municipal, county, and State boundaries. Clearly, the collaboration of several governmental jurisdictions is prerequisite to the solution of the problem. Therefore, the region should be delineated in a way which encourages regional cooperation among the various governmental bodies involved in air pollution control. Usually it is possible to preserve the unity of county governments by including or excluding them in their entirety. Occasionally, this is impractical due to a county's large size, wide variation in level of development, or striking topographical features.

To the extent that any two of the above three objectives lead to incompatible conclusions concerning region boundaries, the region must represent a reasonable compromise. A region should represent the best way of satisfying the three objectives simultaneously.

PROCEDURE FOR DESIGNATION OF REGIONS

After evaluating relevant factors, the National Air Pollution Control Administration publishes a proposed delineation of the region boundaries. The next step is for NAPCA to set a time and place for a consultation meeting and to distribute to State and local authorities a report for the evaluation study which includes the boundary proposal. At the consultation meeting, State and local authorities are encouraged to present fully their views and suggestions concerning the proposed boundaries of the region. Interested parties who do not have official status may submit comments in written form for the record. Following careful review of all suggestions and opinions submitted for the record by interested parties, the Secretary of Health, Education, and Welfare makes a formal designation of the region boundaries and notifies the Governor(s) of the State(s) affected by the designation. Figure 2 illustrates the procedures used by the National Air Pollution Control Administration for designating air quality control regions.

The body of this report contains a proposal for the boundaries of the Four Corners Interstate Air Quality Control Region. The report is intended to serve as the background document for the formal Consultation between the National Air Pollution Control Administration and the appropriate State and local authorities.

ENGINEERING EVALUATION
• EMISSIONS INVENTORY
• TOPOGRAPHY
• METEOROLOGY
• AIR QUALITY ANALYSIS
EXISTING AIR QUALITY DATA
URBAN FACTORS EVALUATION
• JURISDICTIONAL BOUNDARIES
• URBAN-INDUSTRIAL CONCENTRATIONS
• COOPERATIVE REGIONAL ARRANGEMENTS
• PATTERNS AND RATES OF GROWTH
• EXISTING STATE AND LOCAL AIR POLLUTION CONTROL PROGRAMS & LEGISLATION
PRELIMINARY DELINEATION OF REGIONS
CONSULTATION WITH STATE AND LOCAL OFFICIALS
FORMAL DESIGNATION BY SECRETARY-HEW

FIGURE 2 - Flow Diagram for the Designation of Air Quality Control Regions

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I. FOUR CORNERS STUDY AREA

Determination of an appropriate area for study with respect to a proposed air quality control region within the Four Corners, four state, area was based on consideration of the following factors:

1. The study area should recognize the importance of topographical considerations.
2. The study area should include major recreation areas, national parks, national forests, and other conservation related parcels where the quality of air is a determinant of preservation and enjoyment.
3. The study area should include those counties where major industrial development is proposed.
4. The study area should abut, but not include any counties in surrounding proposed air quality control regions.

Utilizing these factors as determinants, an initial study area was defined to include the following counties in the four states (Figure 3):

Arizona:

Apache
Coconino
Navajo
Yavapai

Colorado:

Dolores
La Plata
Montezuma
Montrose
San Juan
San Miguel

New Mexico:

Los Alamos
McKinley
Rio Arriba
San Juan 1/
Sandoval (part)

Utah:

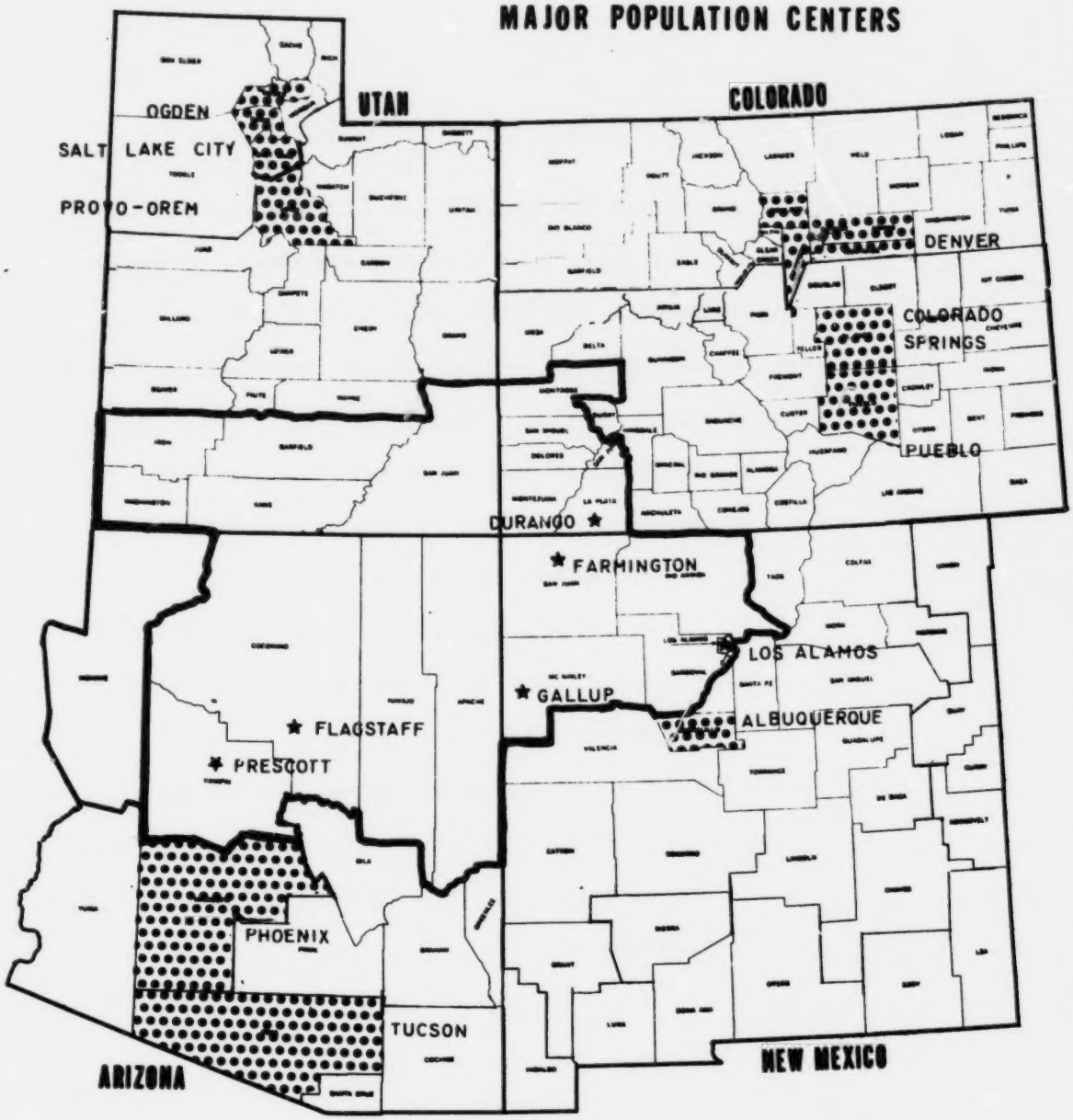
Garfield
Kane
Iron
San Juan
Washington

As Figure 3 indicates, the study area contains no major urban centers. On the west and south it abuts proposed air quality control regions for the Albuquerque, Phoenix, and Las Vegas metropolitan areas. To the east and northeast, the Continental Divide provides a natural boundary. The Wasatch Range and the Uncompahgre Plateau provide a logical northern and northwestern limit.

1/ The southeastern corner of Sandoval County is included in the proposed Albuquerque-Mid Rio Grande Valley Intrastate AQCR. The remainder will be in the study area for this Region. For statistical purposes, the whole county has been included.

FOUR CORNERS AIR QUALITY CONTROL REGION
STUDY AREA: 3

MAJOR POPULATION CENTERS



KEY

FIGURE 3

★ towns with 10,000+ pop. inside Study Area (1970)

SMSA's

Study Area boundary

II. FOUR CORNERS STUDY FORMAT

Initial examination of the study area counties with respect to recent population trends, the economy, topography, mineral resources, and forest and wildlife resources revealed three factors of primary importance in considering the boundaries for an air quality control district:

1. The location and extent of natural and recreation areas where maintenance of the quality of the environment is essential.
2. The location and extent of actual and potential industrial development--i.e., power plants--that could be a source of pollution.
3. Existing governmental regional organizations and Federal governmental interests in the area which could affect administration of air quality standards.

III. GENERAL BACKGROUND

POPULATION TRENDS

The total population of the twenty counties in the study area was 375,021 persons in 1960. Population estimates for 1970 reveal a 9.1 percent increase to an estimated 409,271 persons. A county by county examination reveals a significant trend (see Table I). Nine out of the twenty counties have experienced population declines. Of the remaining counties, all but two--Washington County (Utah) and Yavapai County (Arizona) --have experienced population increases below the 1960 - 1970 four state average of 21 percent. During this same period, all but one of the metropolitan areas in the four state region had marked population increases. These ranged from 12.0 percent in the Salt Lake City Standard Metropolitan Statistical Area (SMSA) to 59.4 percent in the Colorado Springs SMSA.

Population data become more meaningful when examined in terms of land area (see Figure 4). The area of the proposed region totals nearly one hundred thousand square miles. Average density is 4 persons per square mile. Los Alamos with a density of 142 persons per square mile stands out as an obvious exception to the general density pattern. Excluding Los Alamos County, densities range from a high of 11 persons

Table I
Population Changes 1960 - 1970
Four Corners Study Area (States and Counties)
and Major Metropolitan Areas

Study Area States and Counties	1960	1970	Percent Changes
Total, Study Area Counties	375,021	409,271	9.1
Arizona			
Apache	30,438	32,237	5.9
Coconino	41,857	47,355	13.1
Navajo	37,994	45,941	20.9
Yavapai	28,912	38,869	24.1
Total Study Area Counties	139,201	164,402	18.1
State Total	1,302,161	1,752,122	34.6
Colorado			
Dolores	2,196	1,550	-29.4
La Plata	19,225	18,977	- 1.3
Montezuma	14,024	12,604	-10.1
Montrose	18,286	17,876	- 2.2
San Juan	849	811	- 4.5
San Miguel	2,944	1,763	-40.1
Total Study Area Counties	57,524	53,601	- 6.8
State Total	1,753,947	2,195,887	25.2

Population Changes 1960 - 1970

(Continued)

Study Area States and Counties	1960	1970	Percent Changes
New Mexico			
Los Alamos	13,037	15,309	17.4
McKinley	37,209	41,824	12.4
Rio Arriba	24,193	24,576	1.6
Sandoval	14,201	17,084	20.3
San Juan	53,306	51,917	- 2.6
Total Study Area Counties	141,946	150,710	6.2
State Total	951,023	998,257	5.0
Utah			
Garfield	3,577	3,076	-14.0
Iron	10,795	11,982	11.0
Kane	2,667	2,318	-13.1
San Juan	9,040	9,479	4.9
Washington	10,271	13,703	33.4
Total Study Area Counties	36,350	40,558	4.4
State Total	890,627	1,060,631	19.1
Selected Metropolitan Areas			
Arizona			
Phoenix SMSA	663,510	962,918	45.1
Tucson SMSA	265,660	344,635	29.7

Population Changes 1960 - 1970

(Continued)

Study Area States and Counties	1960	1970	Percent Changes
Selected Metropolitan Areas			
(Continued)			
Colorado			
Colorado Springs SMSA	143,742	229,113	59.4
Denver SMSA	929,383	1,240,316	33.5
Pueblo SMSA	118,707	117,212	- 1.3
New Mexico			
Albuquerque SMSA	262,199	313,829	19.7
Utah			
Ogden SMSA	447,795	565,717	26.3
Provo Orem SMSA	106,991	137,675	28.7
Salt Lake City SMSA	110,744	124,035	12.0

Source: U.S. Department of Commerce, Bureau of the Census, County and City Data Book, 1967 and "1970 Census of Population: Preliminary Reports," Arizona, New Mexico, and Utah (PC P1-4,33, and 46). Colorado 1970 Statistics obtained from the Department of Commerce News Release of June 25, 1970.

FOUR CORNERS AIR QUALITY CONTROL REGION
STUDY AREA:
COUNTY & SMSA DENSITIES

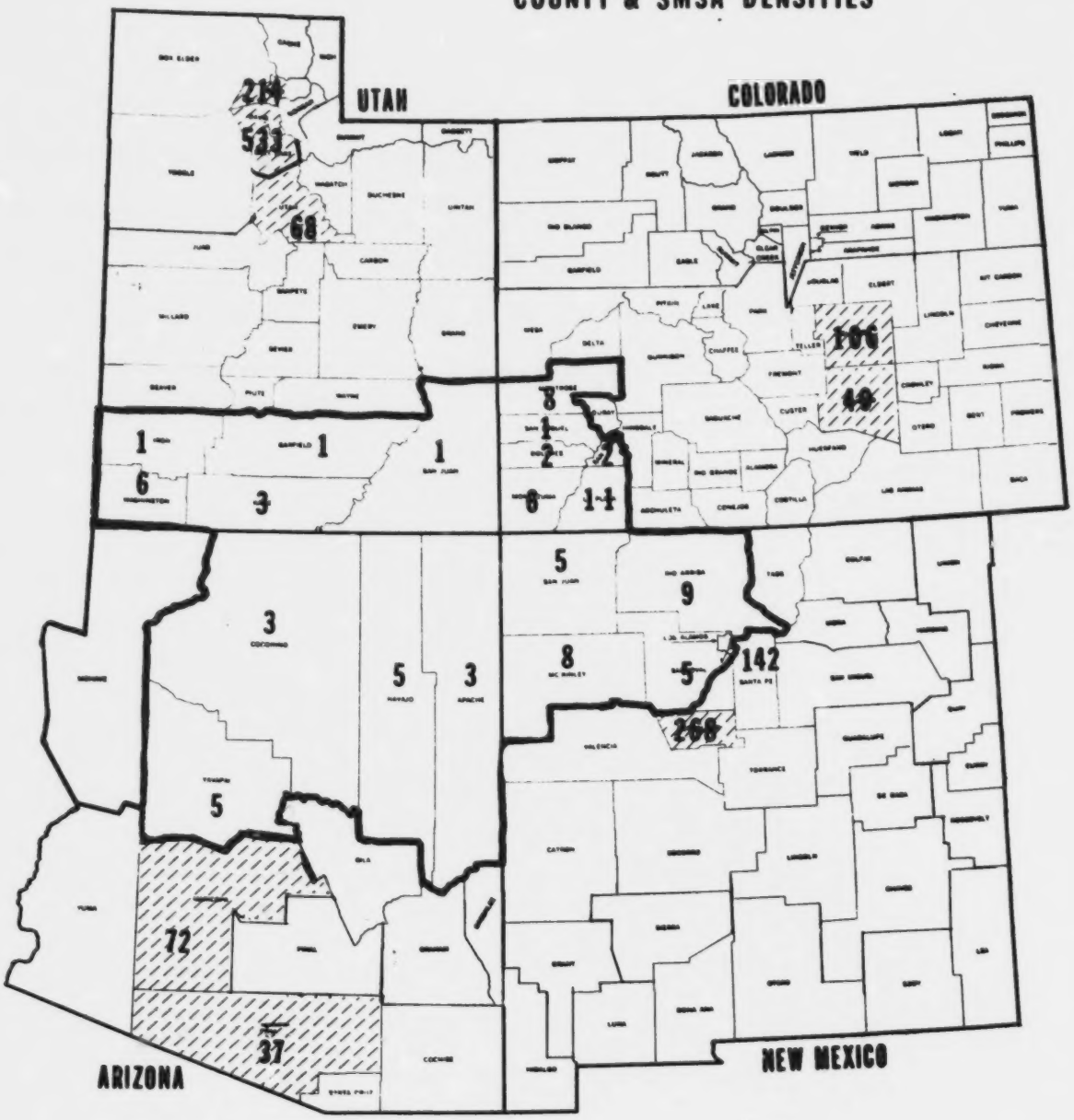


FIGURE 4

KEY

SMSA's

Source: County and City Data Book 1967 (Area)
Bureau of Census 1970 Population Estimates (Population)

per square mile in La Plata County (Colorado) to a low of 1 person per square mile in the counties of San Miguel (Colorado), Iron (Utah), and Garfield (Utah). Again the contrast with surrounding metropolitan area densities is striking. SMSA densities ranged from a high of 533 persons per square mile in the Salt Lake City SMSA to a low of 37 persons per square mile in the Tucson SMSA.

Only five cities and towns within the study area have an estimated 1970 population over 10,000 (see Figure 3). These are the cities of Prescott and Flagstaff in Arizona, the towns of Farmington and Gallup in New Mexico, and the town of Durango in Colorado. The largest of these population centers are Flagstaff and Farmington having a 1970 estimated population of approximately 26,000 and 22,000 respectively.[2/]

ECONOMY

The twenty counties within the study area are included within a larger, formally established area--the Four Corners Economic Development Region. This 92 county region was estab-

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2/ U.S. Department of Commerce, Bureau of the Census. "1970 Census of Population: Preliminary Reports," Arizona and New Mexico.

lished pursuant to the Public Works and Economic Development Act of 1965. The region, one of five in the country, is administered by the Four Corners Regional Commission which is charged with the conduct of planning and action programs designed to overcome the problems of concentrations of economic distress. In June of this year, nine counties in the area had been designated as areas of persistent unemployment (areas averaging more than 6 percent uncemployment over a specified period of time). These counties include Apache and Navajo in Arizona; Rio Arriba, San Juan and McKinley in New Mexico; and Kane, San Juan, Garfield, and Washington in Utah. 3/

Employment data for 1969, excluding Federal civilian employment, identifies three major sources of employment in the study area counties: retail trade, services and manufacturing.

3/ U.S. Department of Labor, Area Trends in Employment and Unemployment, June 1970.

Table II
1969 Employment by Major Industry Group

Major Industry Group	Percent of Total Employment in Study Area Counties (Excluding Federal Civilian Employment)
Retail Trade	27.1
Services	26.3
Manufacturing	14.9
Mining	8.7
Transportation and other Public Utilities	7.7
Contract Construction	6.1
Wholesale Trade	4.3
Finance, Insurance, and Real Estate	3.9
Other	1.0
TOTAL	100.0

Source: U.S. Department of Commerce, Bureau of the Census, County Business Patterns: Arizona, Colorado, New Mexico, and Utah, 1969.

Federal civilian employment, not included in the above data, plays a significant role in area employment. In 1969, approximately eleven thousand persons in the study area were employed by the Federal government. Largest concentrations of Federal employment were in Coconino County, Arizona (3,632 persons), and San Juan County, New Mexico (1,105 persons).

While manufacturing in the Four Corners study area represents a smaller source of employment than it does nationwide (14.9 percent as compared to slightly less than 30 percent nationwide) local efforts are being made to attract new industry not likely to effect air quality detrimentally. The Fairchild Semiconductor plant located in the Farmington, New Mexico area is an example of a successful effort to attract clean air electrical equipment and electronics industries. Detailed examination of the economy will be given only to those sectors which are directly relevant to air quality control. These are mining, power generation, and tourism-related employment.

All of the study area counties, except one--Garfield--have some employment in mining. Employment data for 1969 identified 233 mining establishments in the study area, with the greatest concentration of mining units in the Colorado and New Mexico portions of the study area. The study area counties in these two states contain 174 mining establishments, with 18 of these employing over 50 employees. The two largest of the mining employers (500 or more employees) are located in McKinley and San Juan counties in New Mexico.

While specific county data with respect to mining as a percentage of total county employment is fragmentary due to disclosure laws designed to protect individual reporting units, data is available for several counties within the study area. Employment statistics for 1959, 1964 and 1969 indicate that although mining employment has fluctuated, it still plays a significant part in the employment patterns of several of the study area counties.

Table III
Mining Employment as a Percentage of Total Employment

Study Area Counties for Which Data is Available	Percent 1959	1964	1969
La Plata (Colorado)	11.0	8.1	7.0
Montezuma (Colorado)	5.9	8.0	11.0
Montrose (Colorado)	23.7	26.5	23.7
San Miguel (Colorado)	24.1	71.9	61.8
McKinley (New Mexico)	26.6	27.5	15.1
Rio Arriba (New Mexico)	5.0	6.1	3.4
San Juan (New Mexico)	8.5	17.0	16.0
Garfield (Utah)	0.0	0.0	0.0
Iron (Utah)	28.5	12.3	14.6
San Juan (Utah)	50.2	55.2	31.6

Source: U.S. Department of Commerce, Bureau of the Census, County Business Patterns: Arizona, Colorado, New Mexico, and Utah, 1969.

Future employment in mining is expected to increase significantly due to the development of large coal mines servicing new electric generating plants. These plants will also have a major impact on construction and public utilities employment. With 3 power plants presently in operation in the study area and 3 more scheduled for construction, employment can be expected to increase markedly. For example, it is anticipated that construction of the Navajo power plant in Coconino County, Arizona, will generate 1,500 jobs. Actual operation of the plant will produce another 650 jobs. The Kaiparowits power project in Kane County, Utah, is projected to have a construction payroll of $15,000,000 per year over a 10 year period. Upon completion of the project, some 2,000 or more employees will be needed to operate mines and plants. Other aspects of the existing and proposed power plants will be discussed in detail in the section on Thermal-Electric Generating Plants.

Tourism-related employment was examined only in terms of specific categories within the service and retail sectors of the economy. The categories examined include "eating and drinking establishments," "hotels and other lodging places," "amusement and recreation places" and "gasoline service stations." The data does not begin to suggest the magnitude of employment in other segments of the retail and service sectors

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attributable to tourism, nor does it consider those persons employed by Federal interests such as the National Park and Forest Services. Thus, it presents a low estimate of the importance of tourism to the study area counties.

With respect to specific tourism-related employment, Table IV reveals that tourism is responsible for employment of approximately 13.6 percent of the 57,054 persons employed in the 14 counties for which data is available. In five of these counties--Coconino, Washington, La Plata, Navajo and McKinley--it accounts for more than 15 percent of total employment.

Examination of the same specific categories of tourism-related employment over time reveals both marked increases and substantial declines in tourism-related employment as a share of total employment (see Table V). Percentage declines represent a stabilization, rather than a decline in the absolute numbers of persons employed. Three of the 14 counties for which data is available experienced marked increases in tourism-related employment as a share of total employment: La Plata County (Colorado), McKinley County (New Mexico), and Iron County (Utah). Five other counties--Coconino, Navajo and Yavapai in Arizona, Rio Arriba in New Mexico and Washington in Utah--maintained stable but high percentages of tourism-related employment.

Table IV
Tourism-Related Employment in
Study Area Counties

County	Total County Employment	Tourism-Related Employment[1/] Number of Employees	Tourism-Related Employment[1/] % of Total County Employment
Arizona			
Apache	5,809	179	3.1
Coconino	8,597	2,117	24.6
Navajo	4,503	788	17.5
Yavapai	5,509	758	13.8
Colorado			
Dolores	304	NA	NA
La Plata	3,131	567	18.1
Montezuma	2,177	298	13.7
Montrose	2,848	226	7.9
San Juan	123	NA	NA
San Miguel	343	NA	NA
New Mexico			
Los Alamos	1,948	NA	NA
McKinley	6,408	1,077	16.8
Rio Arriba	1,968	267	13.6
Sandoval	1,317	82	6.2
San Juan	10,093	675	6.7
Utah			
Garfield	407	NA	NA
Iron	2,097	287	13.7
Kane	287	NA	NA
San Juan	928	69	7.4
Washington	1,669	342	20.5
Total for Counties where data available:	57,054	7,732	13.6

1/ Includes employment in eating and drinking places; hotels and other lodging places; amusement and recreation places; and gasoline service stations.

Source: U.S. Department of Commerce, Bureau of the Census, County Business Patterns: Arizona, Colorado, New Mexico and Utah, 1969.

Table V
Tourism-Related Employment[1] as a Share of Total Employment: 1959 and 1969

Study Area Counties	Percentage of Total Employment 1959	1969
Arizona:		
Apache	8.9	3.1
Coconino	23.2	24.6
Navajo	17.3	17.5
Yavapai	12.8	13.8
Colorado		
Dolores	NA	NA
La Plata	10.7	18.1
Montezuma	17.2	13.7
Montrose	8.4	7.9
San Juan	NA	NA
San Miguel	NA	NA
New Mexico		
Los Alamos	NA	NA
McKinley	10.5	16.8
Rio Arriba	12.1	13.6
Sandoval	NA	6.2
San Juan	8.1	6.7
Utah		
Garfield	NA	NA
Iron	7.7	13.7
Kane	NA	NA
San Juan	9.4	7.4
Washington	20.8	20.5

[1] Includes employment in eating and drinking places; hotels and other lodging places; amusement and recreation places; and gasoline service stations.

Source: U.S. Department of Commerce, Bureau of the Census, County Business Patterns, Part 9. Mountain States, 1959 and County Business Patterns: Arizona, Colorado, New Mexico, and Utah, 1969.

Future employment in tourism-related sectors is highly dependent on visitations to area attractions. This aspect of tourism is examined more closely in the section on Natural and Recreational Attractions in the Four Corners Study Area.

TOPOGRAPHY AND METEOROLOGY

The Colorado Plateau, which covers the central portion of the study area, is generally encircled by mountain ranges (see Figure 5) to the northeast the San Juan and Sangre de Cristo Mountains, to the northwest the Wasatch Range, and to the southwest the Mogollon Rim.

Elevations in the area range from about 2,500 feet above mean sea level (msl), excluding lower elevations in the Grand Canyon proper, to well in excess of 9,000 feet msl (see Figure 6). Terrain of less than 5,000 feet elevation constitutes a relatively small percentage of the total area of the Region, and lies in a narrow belt along the Colorado River and a few of its tributaries; this contour area includes the Four Corners Monument along the San Juan River, and extends into Colorado along the Colorado River.

The Continental Divide conforms roughly to the eastern boundary of the Colorado portion of the study area where the land rises to an elevation of over 12,000 feet in the San Juan

FOUR CORNERS AIR QUALITY CONTROL REGION
STUDY AREA:

TOPOGRAPHY

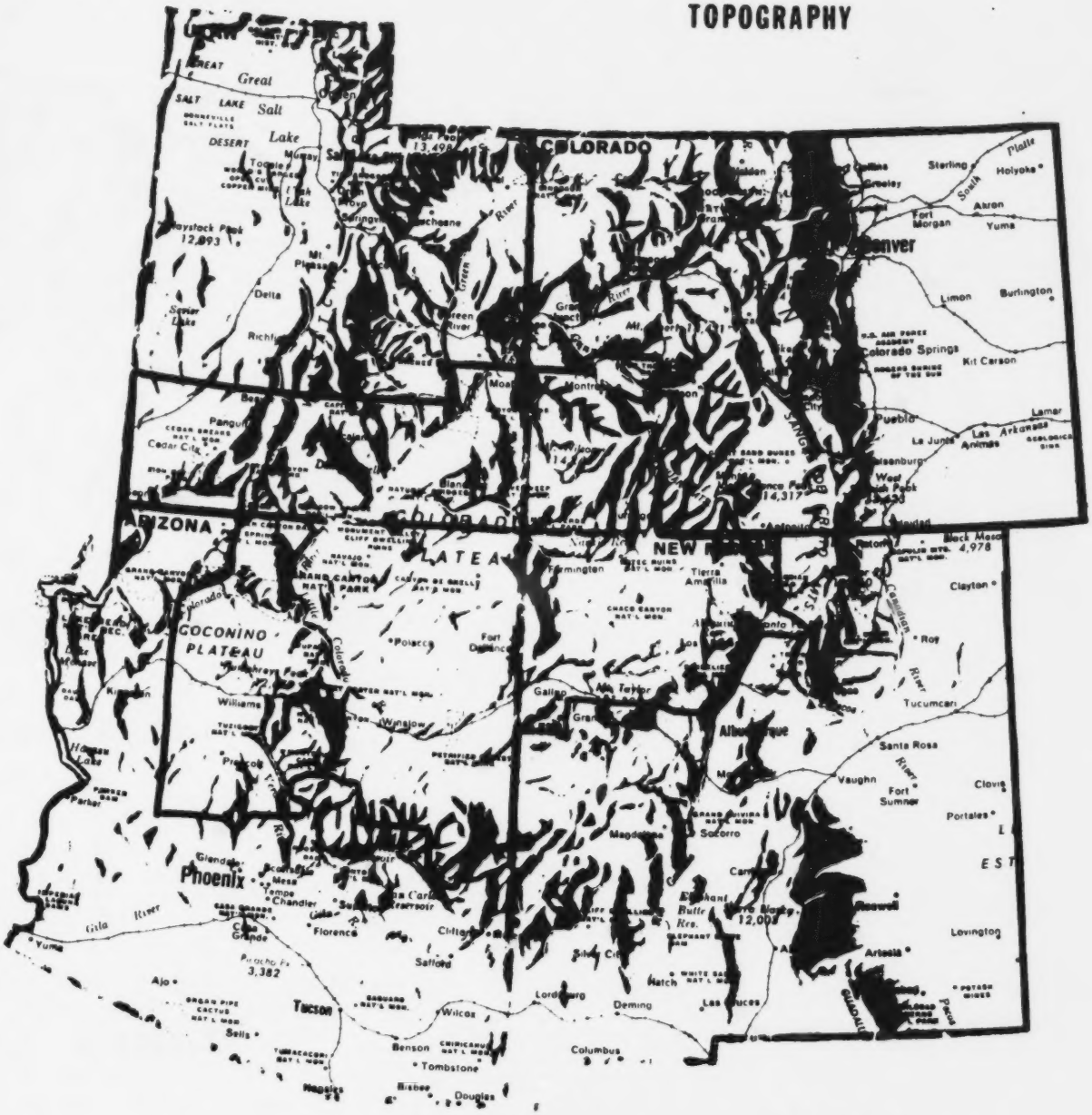

FIGURE 5

Source: Rand McNally Portrait Map of the United States

FOUR CORNERS AIR QUALITY CONTROL REGION
STUDY AREA:

TOPOGRAPHY

Reproduced from best available copy.

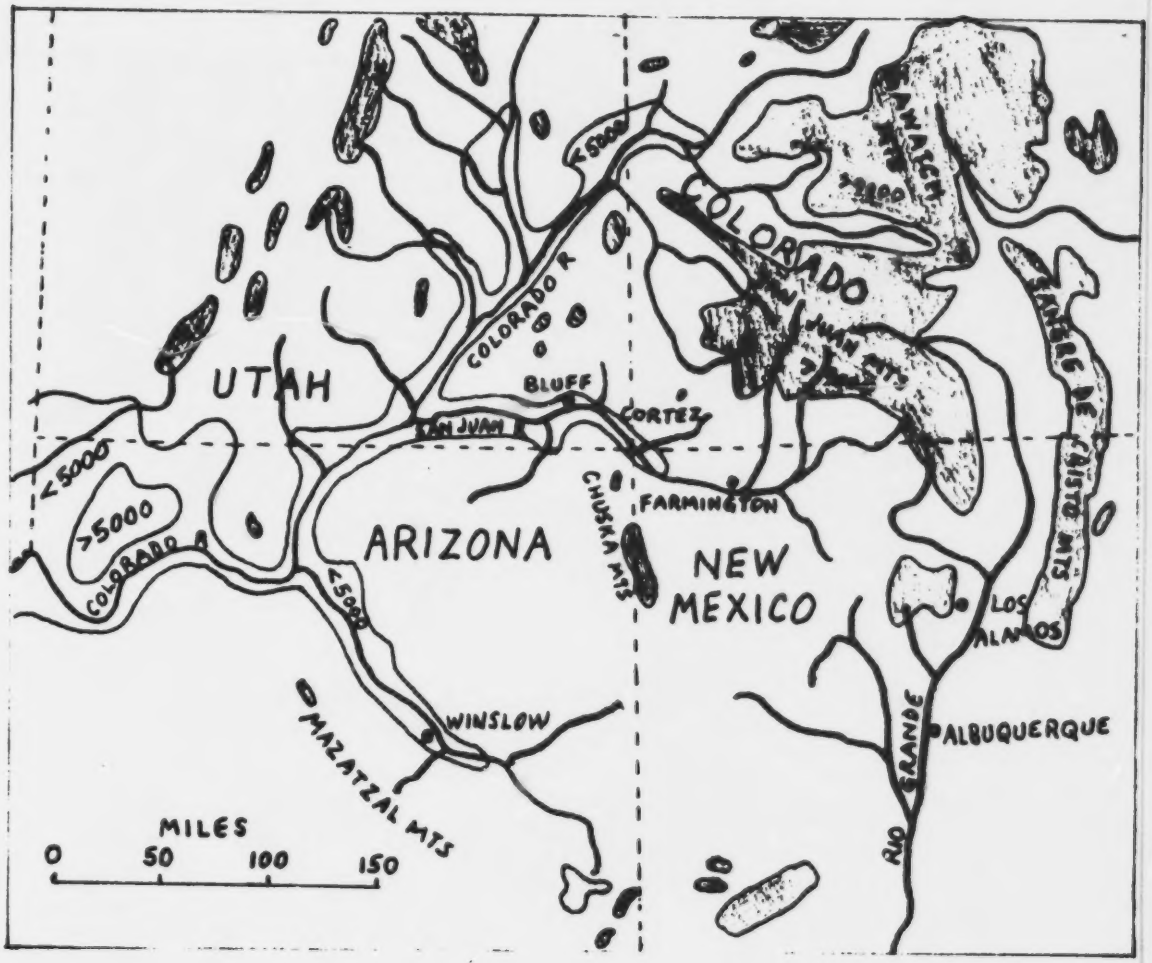

FIGURE 6

KEY

Areas which exceed 9,000 feet msl are shaded.

Mountains. To the north the Uncompahgre Plateau and the Dolores River Valley bound the area. The land then levels into rugged, semi-arid plateau country as it approaches the Four Corners intersection.

The New Mexico portion of the region is largely a continuation of the Colorado Plateau which runs as far east as the Rio Grande River basin. The Continental Divide runs through Rio Arriba and McKinley Counties and the Rio San Jose, Rio Puersco, Jimes and Rio Chama rivers flow southeastward to the Rio Grande. The land elevation rises to the northeast where the San Juan and Sangre de Cristo Mountains extend down from Colorado into New Mexico, and a few scattered peaks in the Zuni Mountains to the south rise above 9,000 feet.

The Utah portion of the study area stretches westward through the plateau country of San Juan County to the Colorado River basin and the Kaiparowits Plateau. Continuing westward the land rises to elevations of 11,000 feet in the Wasatch Range and levels off again to around 6,000 feet in the Escalante Desert in Iron County.

The Grand Canyon winds through the northwest protion of Arizona and is a major topographical feature of the area. Moving southwestward across the Colorado Plateau from the Four Corners intersection the land rises from Chinle Valley to the

Black Mesa country and falls again in the basin of the Little Colorado River. An arm of land 6,000 to 9,000 feet in elevation runs northwest to southwest across the study area and includes the Coconino Plateau and Mogollon Rim.

The study area is shielded from the Pacific Ocean and Gulf of Mexico by high terrain which effectively removes much of the original moisture as air is transported toward the Region. The high terrain is also fairly effective in preventing the extremely cold air masses which sweep southward over the Great Plains from reaching the area.

Several factors result in the visual clarity of the atmosphere in this area: (1) low population density, with correspondingly few sources of air pollution; (2) ground elevations mostly in excess of 5,000 feet which result in lower air density than at lower elevations; and (3) relatively low moisture content of the air. These factors also provide great clarity to thermal (heat) radiation; thus both solar heating and nocturnal cooling are typically quite pronounced, resulting in great extremes of stability during the diurnal cycle. Stable conditions (temperature inversion below 500 feet above ground level) occur during from 80 to 90^{+} percent of the days annually in a broad area around Four Corners. The greatest frequency occurs in Winter, and the least in Spring.

During stable conditions the local topography within an area such as is being discussed frequently dictates the direction of air movement at least in the lower few hundred feet. The tendency is for air to drain down-slope and down-river; pollutants can be carried great distances with little dilution at these times. During unstable conditions which develop as solar heating occurs, the airflow tends toward up-slope movement in many cases, but the direction of movement is also affected by the winds at altitudes well above ground level. The diurnal shift in surface wind direction is quite evident at, for example, Farmington, New Mexico where two-thirds of the 6 A.M. winds, but only one-eighth of the 3 P.M. winds, have a down-valley component (i.e., toward the west).[4/] Considerably different wind patterns, relative to True North, can be shown for other locations.

Maximum mixing depth (MMD) is defined as the height above ground to which well defined vertical mixing occurs in the atmosphere at the time of maximum daily temperature. The volume

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4/ Estimates of Air Pollution Concentrations from Four Corners Power Plant, New Mexico. U.S. Department of Health, Education, and Welfare, CEPHS. January 1970.

into which pollutants may be mixed is directly related to the MMD. Monthly averages of MMD in the Four Corners area range from 1,300 feet in January to 12,500 feet in June. The seasonal averages are 1,600 feet in Winter, 8,900 feet in Spring, 11,500 feet in Summer, and 4,900 feet in Autumn.

Days during which high air pollution potential has been forecast by U.S. ESSA in the Region have averaged up to about three per year since 1963.

Wide ranges in the ability of the atmosphere to diffuse pollutants in the Region can occur with variation in time, elevation, or horizontal displacement. Hence, exceptions can be found to most generalizations that might be profferred in describing the diffusion climatology. Great care must be taken in selecting air sampling sites or when considering the application of mathematical modelling to atmosphere diffusion of pollutants.

MINERAL RESOURCES

Coal

Coal produced in the study area is used primarily by electric utilities and this factor is expected to be of increasing importance in the near future. Although the amount of coal mined to date is relatively minor and involves a small portion of the total area labor force, extensive deposits of

unmined bituminous and sub-bituminous coal are located in many counties in the study area (see Figure 7) exploration has not yet been extensive enough to define these deposits in detail.

The area of New Mexico underlain by coal is estimated to be 14,650 square miles, the great majority of which is in the study area. Recoverable deposits are estimated to be 4.8 billion short tons.[5/] Coal is presently being recovered in San Juan and McKinley Counties by strip mining methods. Recoverable deposits in Arizona are located in the Black Mesa area and are estimated to be in excess of 300 million short tons.[6/]

Sub-bituminous coal deposits exist in several counties of the Colorado portion of the study area. Small amounts of bituminous coal are mined in La Plata and Montrose Counties in Colorado.

Utah coal reserves in the study area are concentrated in the Kaiparowits, Kanab, and Kolob fields. The Kaiparowits field (which covers parts of Kane and Garfield Counties) is the largest in southwestern Utah and may contain in excess of 3 billion tons of recoverable bituminous coal. Deep mining

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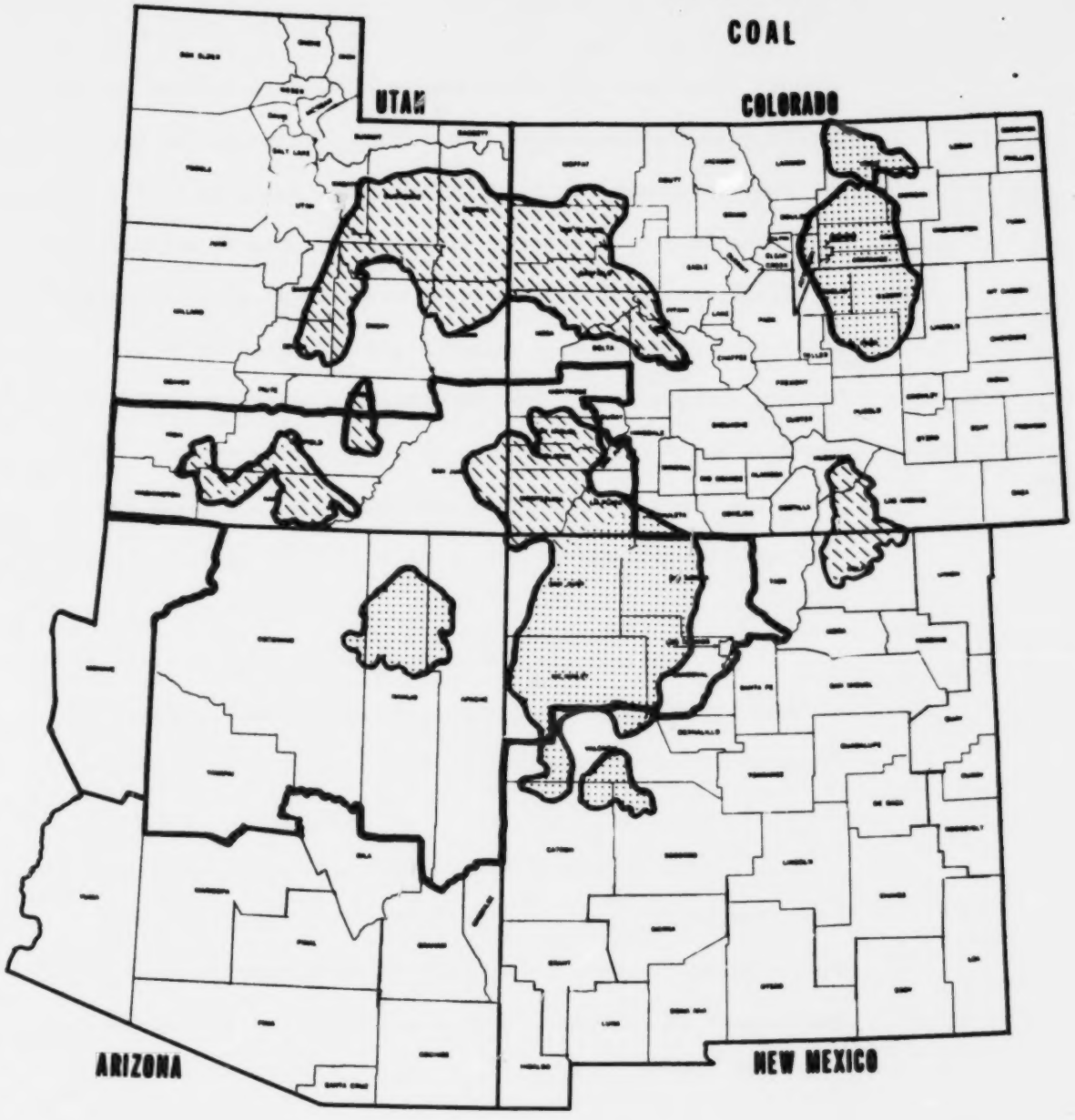
5/ The Future of Power in the West Region 1970-1980-1990, A Report to the Federal Power Commission, by the West Regional Advisory Committee, June 1969.

6/ Ibid.

FOUR CORNERS AIR QUALITY CONTROL REGION
STUDY AREA:

COAL



bituminous coal

Subbituminous coal

FIGURE 7

recovery is necessary. The area is generally inaccessible and the terrain is difficult. However, mine mouth use of the coal for power generation has been proposed and slurry pipeline transport may also be feasible. The Kolob field (located in southern Iron, western Kane and northwestern Washington Counties) is also inaccessible and deep mining would generally be necessary although some deposits are stripable. The Kanab field is located in northwestern Kane County and is estimated to contain 1.7 million tons. Strip mining conditions appear to be ideal.

OTHER MINERAL RESOURCES

A wide variety of mineral resources are found in the study area and surrounding counties. Copper production in the study area is centered in Yavapai County, Arizona where a major open pit mine is located. Over 20,000 short tons of copper ore were mined in Yavapai County in 1967. Mines in San Miguel and San Juan County, Colorado produced approximately 2,700 short tons in 1967 while mines in San Juan County, Utah produced approximately 515 short tons.

Uranium deposits are found throughout the study area. During the past twenty years mines have been operated in at least ten of the study area counties. Mining is presently concentrated in McKinley and Valencia counties in New Mexico just

south of the study area. These counties account for almost 80 percent of the short tons of ore shipped in the Four Corner states. Other active mines are located in Montrose, Dolores, Mesa and San Miguel counties, Colorado and San Juan, Emery, Grand, Garfield and Kane counties in Utah. Table VI indicates total mine production by states for 1969. While some portion of the production total comes from mines not in the vicinity of the study area, the data provides a good indication of the magnitude of production.

Table VI
1969 Uranium Mine Production by States

State	Ore Shipped		Recoverable Content U_3O_8	
	Short Tons	Value (Thousands)	Thousand Pounds	Value (Thousands)
Colorado 1/	620,641	$ 11,772	2,736	$ 16,935
New Mexico	3,057,592	$ 45,659	11,811	$ 69,887
Utah	298,746	$ 4,531	1,140	$ 6,824
Arizona	NA	NA	NA	NA

Source: U.S. Department of Interior, Bureau of Mines, Minerals Yearbook, 1969 (Draft).

1/ Includes data for central and northern parts of the state.

A uranium ore processing plant is located at Uravan in Montrose County, Colorado. Several plants are located just outside the study area. Three large plants are located in the vicinity of Grants and Bluewater, Valencia County, New Mexico and one plant is located in Moab, Utah just north of San Juan County.

Table VII
Uranium Ore Processing Plants - December 31, 1969

State and Company	Plant Location	Nominal Capacity Tons Per Day
Colorado:		
American Metal Climax Inc.	Grand Junction (Mesa County)	500
Union Carbide Corp.	Uravan (Montrose Co.)	1,500
New Mexico:		
The Anaconda Company	Bluewater (Valencia Co.)	3,000
Kerr-McGee Corp.	Grants " "	6,000
United Nuclear-Homestake Partners	" " "	3,500
Utah:		
Atlas Corporation	Moab (Grand County)	1,500
Arizona:		
NA	NA	NA

Source: U.S. Department of Interior, Bureau of Mines, Minerals Yearbook, 1969 (Draft).

Crude oil production is increasing in the study area. Table VIII indicates the major production centers. There are several small refineries in and near the study area. In Colorado there are two refineries in Mesa County and in New Mexico there is a refinery in San Juan County.

Table VIII
Crude Oil Production by Counties
(Thousand 42-gallon barrels)

State/County	1966	1967
Arizona:		
Apache	NA	2,900 1/
Colorado:		
La Plata	23	24
Montezuma	825	529
New Mexico:		
McKinley	204	312
Rio Arriba	1,365	1,343
Sandoval	7	9
San Juan	9,743	9,415
Utah:		
Garfield	224	432
San Juan	15,948	15,304
TOTAL:	28,339	30,268

Source: U.S. Department of Interior, Minerals Yearbook, Volume III, 1967.

1/ Estimate based on total State production.

Lead and zinc are produced in significant quantities in San Juan and San Miguel Counties in Colorado. Zinc production in 1967 in San Juan County was 8,542 short tons and in San Miguel County it was 13,021 short tons. Lead production in San Juan County was 5,527 short tons while in San Miguel County it was 8,013 short tons.

FOREST AND WILDLIFE RESOURCES

Table IX indicates the variety of vegetation and timber resources included within the boundaries of National Park Service areas within the study area.

In addition to the Park Service areas, National Forests located entirely or partially within the study area contain over 17 million acres of land. An additional 72 thousand acres is being acquired. These figures provide a rough approximation of the extent of forested land in the study area.

Wildlife abounds in many portions of the study area. There are an estimated 4,500 mule deer and 200 bighorn sheep on National Park Service lands. The deer harvest in the study area counties in Colorado in 1969 was over 10,000. The Elk harvest in La Plata County, Colorado in 1969 was 1,220.[7/] These figures are indicative of the extent of big game resources in the region.

7/ Colorado Department of Natural Resources, Division of Game, Fish and Parks, Colorado Big Game Harvest, 1969.

Table IX
Vegetation Classification and Acreage
Within National Park Service Areas

Grassland:	895,210
(Gramma, muhly, ricegrass, western wheat, etc.)	
Brushland:	508,580
(Sage, rabbitbrush, saltbush, mountain mahogany, cliffrose, manzahita, Mormon tea, yucca, cholla, prickly pear, etc.)	
Woodland:	458,700
(Pinyon pine, juniper, cottonwood, oak, ash, locust, box elder, etc.)	
Forest:	252,094
(Ponderosa pine, douglas fir, white fir, englemann spruce, blue spruce, etc. NOTE: Includes some small areas of sub-alpine group)	
Sub-Alpine:	5,010
(Brislecone pine, spruce, and fir under alpine conditions.)	
TOTAL ACREAGE:	2,115,594

Source: National Park Service, Southwest Region.

IV. NATURAL AND RECREATION ATTRACTIONS IN THE FOUR CORNERS STUDY AREA

A primary concern in the Four Corners study area is the maintenance of high quality air to enable the preservation and enjoyment of natural and scenic areas. The study area encompasses a significant portion of the Nation's most scenic landscape and recreational areas. Six of the country's 35 National Parks are located within the study area, covering some 51,525 acres. Seventeen National Monuments (slightly less than one-fourth of all National Monuments), one of the largest National Recreation Areas (Glen Canyon) and 12 National Forests are also within the study area (see Figure 8).

While the area has already been examined briefly in terms of the effects of tourism on local employment, little has been said about the area in terms of national importance. A study done in the early 1960's found that 74 percent of visits to the Grand Canyon National Park came from more than 500 miles away. The location of the study area--about a day's drive from California and only slightly further from Texas--makes it a prime vacation target of the massive population in those states. It is evident that there is a National interest in preserving the quality of the environment in this area.

FOUR CORNERS AIR QUALITY CONTROL REGION STUDY AREA:

NATIONAL PARKS, MONUMENTS, AND RECREATION AREAS

FIGURE 8

NATIONAL PARKS

The six National Parks located within the study area are: Bryce Canyon, Canyonlands, Grand Canyon, Petrified Forest, Zion and Mesa Verde. All of these parks except Mesa Verde are administered primarily as natural areas; the latter is administered as an historic area, containing ruins of Indian cliff dwellers nearly 1,000 years old. The most famous of the National Parks is, of course, the Grand Canyon. Two hundred and seventeen miles long, four to eight miles wide at the brim and about a mile deep, the Canyon is the earth's largest gorge. Maximum enjoyment of this wonder, like the enjoyment of all of the area's canyons and gorges, is dependent upon a high level of visibility. Canyonlands National Park, one of the newest additions to the National Park system, exhibits diversified scenic and archeological features typical of the study area. Canyonlands is the site of Upheaval Dome, formed by salt eruptions, 40 mile wide erosional basins and extensive stone carvings chipped by prehistoric Indians about 1,000 years ago. The extensive natural exhibit of petrified wood at the Petrified Forest and the Pink Cliffs of Bryce Canyon National Park complete the scenic picture.

NATIONAL MONUMENTS

The National Monuments within the study area are administered primarily as historic areas, although six of the seventeen monuments

are administered as natural areas. These include Cedar Breaks, Natural Bridges and Rainbow Bridge in Utah and Grand Canyon, Marble Canyon and Sunset Crater in Arizona. Most of the natural bridges in the United States are located within the Four Corners area. The Natural Bridges National Monument contains three such natural bridges (Sipapu, Kachina and Owachomo) formed by rocks more than 225 million years old. Rainbow Bridge, rising to a span of 309 feet above the stream below, is the world's largest natural bridge. The volcanic attractions located at Sunset Crater and Grand Canyon National Monuments provide still another attraction for geologists and tourists alike. Sunset Crater, a cinder cone formed by eruptions occurring about 900 years ago, is also the site of the Wupatki National Monument. This Monument contains approximately 800 Indian ruins. Bandelier National Monument typifies another unique aspect of the study area: approximately 90 percent of the Monument is and will remain a wilderness area (i.e., closed to mechanical vehicles). The tan cliffs, forested mesas and deep gorges can be seen by trips, on foot, along the numerous trails of the Monument. Cliff ruins as well as one of the largest calderas (saucer-shaped depressions) in the world make Bandelier a geological and archeological attraction.

NATIONAL RECREATION AREAS

Glen Canyon, encompassing 1,186,444 acres of land, is one of the Nation's largest National Recreation Areas. Its outstanding feature is Lake Powell. The chief distinction of the 186 mile long lake is its 1,800 mile shoreline indented with canyons with high vertical walls and overhanging cliffs. The national significance of Glen Canyon, as well as the other National Parks and Monuments in the study area, can be more clearly seen by examining visitation data.

VISITATION TRENDS: NATIONAL PARKS, MONUMENTS AND RECREATION AREAS

Statistics prepared by the National Park Service show that in 1969 there were 11 National Parks, Monuments and Recreation Areas with an annual visitation of over 100,000 persons, as compared to 6 such areas with comparable visitation records in 1960 (see Table X).

Table X
Annual Visitation Comparison, 1960 and 1969
(Areas with over 100,000 visits)
National Park, Monument or Recreation Area

State	1960	1969
Arizona	Grand Canyon Petrified Forest	Grand Canyon Petrified Forest Canyon De Chelly Glen Canyon Sunset Crater Wupatki
Colorado	Mesa Verde	Mesa Verde
New Mexico		Bandelier
Utah	Bryce Canyon Cedar Breaks Zion	Bryce Canyon Cedar Breaks Zion

Source: National Park Service, Southwest Region.

As shown in Table XI there have been marked increases in visitations to the area's National Parks, Monuments and Recreation Areas. Eleven of the area attractions had visitation increases over 100 percent (Canyon De Chelly, Grand Canyon, Navajo, Pipe Spring, Sunset Crater and Wupatki in Arizona; Hovenweep and Mesa Verde in Colorado; and Cedar Breaks, Natural Bridges and Rainbow Bridge in Utah). While the increase in visitations range from a low of 6.3 percent in Walnut Canyon National Monument to 3,209.1 percent at the Natural Bridges Monument, the average percent increase in visitations for all parks, monuments and recreation areas is nearly 99 percent.

NATIONAL FORESTS

Twelve National Forests lie entirely or partially within the study area. These are: Apache, Coconino, Kaibab, Prescott, and Sitgreaves in Arizona; San Juan and Uncompahgre in Colorado; Carson, Cibola and Santa Fe in New Mexico; and Dixie and Manti La Sal in Utah. National Forests are a focal point of recreational activities in this country. The Forest Service has identified over forty types of activities enjoyed by visitors to National Forests. The most popular of these include camping, picnicking, horseback riding, viewing scenery, nature study and acquiring an understanding of the environment, hunting and fishing. The re-

Table XI
Changes in Annual Visitations
To National Parks, Monuments and Recreation Areas
In the Four Corners Study Area
1960-1969

(thousands of persons)

NAME	CATEGORY	1960	1969	Percent Change
ARIZONA				
Canyon De Chelly	NM	20.5	408.3	1,891.7
Grand Canyon	NM	.8	1.8	125.0
Grand Canyon	NP	1,186.9	2,192.6	84.7
Marble Canyon	NM	1/	1/	1/
Navajo	NM	2.5	75.8	2,932.0
Petrified Forest	NP	911.5	1,002.0	9.9
Pipe Spring	NM	7.3	27.2	272.6
Sunset Crater	NM	80.5	232.9	189.3
Walnut Canyon	NM	66.3	70.5	6.3
Wupatki	NM	56.6	113.8	101.1
COLORADO				
Hovenweep	NM	2.8	7.2	157.1
Mesa Verde	NP	225.7	513.8	127.7
Yucca House	NM	.1	2/	2/
NEW MEXICO				
Aztec Ruins	NM	38.1	62.6	64.3
Bandelier	NM	81.6	133.4	63.5
Chaco Canyon	NM	25.8	34.6	34.1
El Morro	NM	18.4	25.1	36.4

Category Key: NP - National Park
NM - National Monument
NRA - National Recreation Area

1/ Data not available because this is a new park
2/ Closed

NAME	CATEGORY	1960	1969	Percent Change
UTAH				
Bryce Canyon	NP	272.0	366.9	34.9
Canyon Lands	NP	3/	26.0	3/
Cedar Breaks	NM	115.8	298.4	157.6
Glen Canyon	NRA	4/	781.3	4/
Natural Bridges	NM	6.5	37.8	481.5
Rainbow Bridges	NM	1.1	36.4	3,209.1
Zion	NP	575.8	904.3	57.1
TOTAL		3,696.0	7,352.4	98.9

Source: National Park Service, Southwest Region

Category Key:
NP - Naticnal Park
NM - National Monument
NRA - National Recreation Area

3/
4/New Park
New Park

lationship between the enjoyment of these activities and a quality environment is obvious.

Visitation data with respect to National Forests over a three-year period (1966-1969) indicate a high usage of National Forests (see Table XII). In 1969, over 8 million persons visited (were present for 12 hours or more) the 12 National Forests in the study area. Data available for 10 of the 12 Forests reveal increases in visitations ranging from 8.0 percent at Kaibab National Forest to 59.9 percent at Sitgreaves National Forest. The average increase in visitations in the 10 Forests was approximately 34 percent.

BUREAU OF RECLAMATION AND BUREAU OF LAND MANAGEMENT RECREATIONAL AREAS

In addition to the recreational attractions of National Parks, Forests and the like, recreational sites and facilities are provided as a part of Bureau of Reclamation projects and on land administered by the Bureau of Land Management (BLM). As part of its philosophy of multipurpose use of reclamation projects, it is the objective of the Bureau of Reclamation to administer project areas in a manner that will result in a maximum beneficial use for hunting, fishing and other forms of outdoor recreation. There are eleven reclamation projects within the

Table XII
Visitations to National Forests
Completely or Partially in the Study Area
1966-1969

National Forest	Number of Visitor Days of Use[1] 1966	1969	Percent Increase in Visitations 1966 - 1969
Arizona:			
Apache	618,100	729,100	21.8
Coconino	NA	966,400	NA
Kaibab	906,700	979,000	8.0
Prescott	433,800	629,500	45.1
Sitgreaves	225,400	360,500	59.9
Colorado:			
San Juan	813,800	1,055,500	29.7
Uncompahgre[2]	479,600	652,100	36.0
New Mexico:			
Carson	NA	596,500	NA
Cibola	444,500	633,800	42.6
Santa Fe	422,900	551,800	30.5
Utah:			
Dixie	492,600	545,700	10.8
Manti-La Sal	267,400	406,700	52.1

1/ Visitor Day Units are determined by a person's presence in a National Forest for 12 hours or more.

2/ Data is for combined Uncompahgre and Grand Mesa National Forests. The latter is outside of the study area.

Source: U. S. Department of Agriculture, Forest Service

study area, each of which contains one or more reservoirs. Facilities for camping, picnicking, hunting, fishing and water sports are often provided as an integral part of project development. The Bureau of Land Management applies comparable multiple use principles to the land it administers. Recreational pursuits on BLM managed land consist primarily of camping, hiking, hunting, fishing, and rockhounding.

Data with respect to visitations to recreational areas and facilities within the study area are not readily available. However, national estimates suggest more than a doubling of visitations to Federal reclamation projects from 1958 to the present, and the Bureau of Land Management has indicated that its recreational areas are presently equipped with facilities that can handle only 2.5 percent of visitors. Increasing demands on BLM recreational sites have led the Bureau to increase its emphasis on the provision of recreational facilities. 8/

FUTURE PROSPECTS

Prospects with respect to an increase in tourism and related employment are closely tied to a dollar investment in the area's highway system. At present, some attractions are limited

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8/ 1970 Appropriation Hearings of the Bureau of Reclamation and the Bureau of Land Management before the House.

to jeepsters or horseback riders. While some of the limitations are connected to an area's designation as a wilderness area (closed to mechanical vehicles), many of the restrictions are simply the result of the absence of an extensive highway network. While specific rates of growth of tourism remain uncertain, past visitations document the nation's interest in this area as one of the country's last outposts of natural and scenic resources.

V. THERMAL-ELECTRIC GENERATING PLANTS

The most important trend in industrial development in the study area stems from the increasing demand for electrical energy in the metropolitan areas of the Southwest and Pacific Coast. Demand for power in Southern California has doubled every eight years. It is estimated that total power demands in load centers in the west will quadruple between 1970 and 1990. In addition there are special power demands brought about by activities such as the Central Arizona Project that will require new power generating facilities.

The pattern of power generation to meet this demand is expected to change significantly in the future. Hydroelectric generation has been the major source of power in the past, but most hydro sites have now been developed and the bulk of additional generation demands will have to be met by thermal generation.

It is expected that thermal generation will exceed hydro generation by 1975 and become increasingly important thereafter. The pattern of thermal generation will also change drastically. To date, gas and oil have been the primary sources of fuel and the plants have been located near load centers. In the future coal and nuclear fuels will be much more important. Table XIII illustrates expected changes in terms of fuel mix through 1990.

TABLE XIII
Thermal Electric Utility Generation, Billion KWH

Fuel	1970		1980		1990	
	KWH	Percent of Total	KWH	Percent of Total	KWH	Percent of Total
Coal	30.6	20.5	123.6	27.6	207.6	20.6
Gas	92.5	62.1	76.7	17.2	75.9	7.5
Oil	16.9	11.2	34.6	7.7	30.7	3.1
Nuclear	8.1	5.4	207.7	46.5	685.2	68.1
Other	1.0	.7	4.4	1.0	7.4	.7
Total	149.1	100.0	447.0	100.0	1,006.8	100.0

Source: The Future of Power in the West Region, 1970-1980-1990. A Report to the Federal Power Commission, by the West Regional Advisory Committe, June 1969.

There are a variety of reasons for these expected changes in fuel mix although some assumptions are as yet quite tentative. Natural gas sources are limited and demand from other uses has led to significant price increases and interruptions in supply. These factors will eventually result in decreasing use of this fuel for electrical power generation. Air pollution standards have necessitated the use of low sulphur fuel oil at a cost premium. The bulk of low sulphur fuel oil supplies must be imported and it is expected that this fuel will be used primarily during periods when natural gas supplies are interrupted. Although the development of nuclear facilities to date has been slowed by high construction costs and by lack of public acceptance, it is expected that this method of generation will become very competitive in the 1980's.

Present and expected future limitations on use of oil and gas fuels and uncertainties about nuclear generation have led to serious consideration of the remote coal resources of the Four Corners area as fuel for power generation.

Two other factors have given impetus to this development. One has been joint ownership arrangements that allow several utilities to pool resources for the concentration of very large plants that benefit from economies of scale. The second has been the development of extra high voltage transmission lines

that facilitate efficient long distance transmission of electricity. As a result of these conditions, a number of important actions have been taken in recent years regarding the planning and construction of thermal electric generating plants in the Four Corners area (see Figure 9).

The first power generating facilities designed to take advantage of coal deposits in the Four Corners area were the Four Corners plant, Units 1, 2, and 3, northwest of Farmington, San Juan County, New Mexico, and the Cholla plant near Joseph City, Navajo County, Arizona. These facilities went into operation in 1963. Table XIV lists these and other plants that are under construction and in planning in and near the study area.

It is not yet certain that the Kaiparowits plant will be constructed. A water agreement has been obtained, but studies are being made to determine the feasibility of utilizing nearby coal deposits. An assessment is also being made of the cost impact of electrical transmission requirements.[9/]

The availability of water and the costs of transmission are of critical importance in considering the potential for additional generating plants in the Four Corners area.

9/ Kaiparowits Power Project--A speech by William R. Gould, Senior Vice President, Southern California Edison Co., at the 11th Annual Engineering Symposium, Brigham Young University, April 18, 1970.

FOUR CORNERS AIR QUALITY CONTROL REGION
STUDY AREA:

EXISTING & PROPOSED THERMAL-ELECTRIC
GENERATING PLANTS

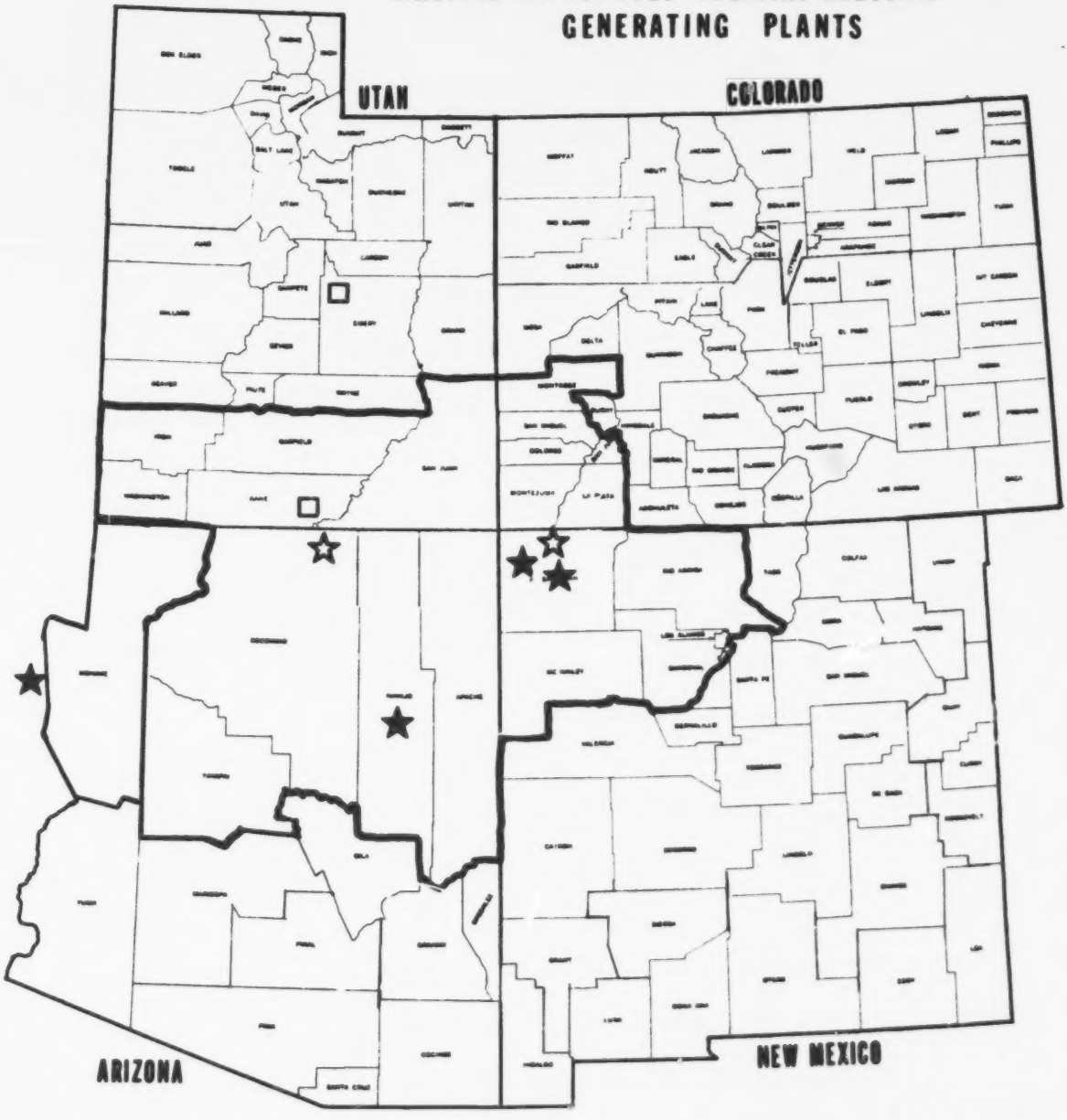

FIGURE 9

KEY

★ in operation
☆ under construction
□ being planned

Table XIV

Coal Fired Thermal Electric Generating Plants in and Near the Four Corners Study Area

Name and Ownership	Location	Start of Operation	Installed Capacity in Megawatts	Coal Source
Cholla Arizona Public Service Company	Navajo County: 2 miles east of Joseph City Arizona	1963-1964	115	Strip mine at plant. Transport by truck
Four Corners-Units 1,2,& 3 Arizona Public Service Company	San Juan County: 16 miles southwest of Farmington, New Mexico	1963	575	Strip mine north of Gallup, New Mexico. Transport by rail
Four Corners-Units 4 & 5 Arizona Public Service Company Southern California Edison Company Public Service Company of New Mexico	San Juan County: 16 miles southwest of Farmington, New Mexico	1969-1970	1,500	Strip mine at plant. Transport by truck

Table XIV

(continued)

Name and Ownership	Location	Start of Operation	Installed Capacity in Megawatts	Coal Source
Four Corners-Units 4 & 5 continued Salt River Project Tucson Gas and Electric Company El paso Electric Company	16 miles southwest of Farmington, New Mexico	1969-1970	1,500	Strip mine at plant. Transport by truck.
San Juan Public Service Company of New Mexico Tucson Gas and Electric Company	San Juan County: 9 miles north of Four Corners Plant	1974	330	Strip mine at plant
Navajo Salt River Project Los Angeles Department of Water and Power Arizona Public Service Company	Coconino County: 4 miles east of Page, Arizona	Unit 1, 1974 Unit 2, 1975 Unit 3, 1976	2,310	Strip mine on Black Mesa. Transport by rail.

Table XIV

(continued)

Name and Ownership	Location	Start of Operation	Installed Capacity in Megawatts	Coal Source
Navajo-continued Nevada Power Company Tucson Gas and Electric Company U.S. Bureau of Reclamation	4 miles east of Page, Arizona	Unit 1, 1974 Unit 2, 1975 Unit 3, 1976	2,310	Strip mine on Black Mesa. Transport by rail
Kaiparowitz (in planning) Southern California Edison Company Arizona Public Service Company San Diego Gas and Electric Company	Kane County: Alternate sites at Warm Creek, Utah (12 miles north of Page) and Sit Down Bench, Utah (20 miles northeast of Page)	1977	5,000-6,000 (ultimate)	Underground mines on Karparowits Plateau
Mohave Southern California Edison Company Los Angeles Department of Water and Power	Nevada side of Colorado River near Davis Dam	1970	1,580	Strip mine on Black Mesa. Transport by slurry pipeline.

Table XIV

(continued)

Name and Ownership	Location	Start of Operation	Installed Capacity in Megawatts	Coal Source
Mohave-continued				
Nevada Power Company Salt River Project	Nevada side of Colorado River near Davis Damn	1970	1,580	Strip mine on Black Mesa. Transport by slurry pipeline.
Huntington Canyon	Emery County:			
Utah Power and Light Company	29 miles southwest of Price, Utah	1974	430	Underground mine. Transport by conveyor belt.

Water is not available in sufficient quantity near many of the coal deposits to support mine mouth plants. This limitation may be overcome in the future by the design of more efficient dry cooling towers. In the meantime, short range transport of the coal by truck, rail or slurry pipeline to sites where water is available appears to be economically feasible as demonstrated by the plans for plants now under construction at the Navajo and Mohave sites. Such arrangements may be possible for additional plants, but the future availability of water in the study area is quite uncertain. A report prepared by the Task Force on Generation (Subcommittee on Generation) of the West Regional Advisory Committee to the Federal Power Commission projected a leveling off of coal-fired thermal generation after 1980 for the New Mexico and Northwest Texas areas due to limitations on sources of cooling water.

According to the U.S. Bureau of Reclamation, the only significant amount of water in the study area which may be committed to power plant use in the future (over and above that committed for plants previously listed in this report) is in the San Juan River--Four Corners plant area. The commitment of unused water could change, however, so that a projection of future power plant development based on this factor can only be considered tentative. In any case, during the next

decade the coal resources of the Four Corners area will be very competitive as a fuel source and decisions on additional power plants will hinge more on the operating experience of plants now under construction and on the availability of water than on external factors. Barring major problems, one or two additional large plants with a rating of 5,000 to 6,000 megawatts might be developed before 1980 in the New Mexico and/or Colorado area. After 1980, water restrictions and the competitive influence of nuclear generation may limit development. The water problem may be resolved with the importation of water from northern states or seawater desalting plants, or through technical improvements in dry cooling. Alternatively, coal will be transported by rail or pipeline to water surplus areas in Wyoming and other states.

VI GOVERNMENTAL JURISDICTIONS

The geographic extent of the jurisdiction of existing air quality control agencies, State planning districts, economic development districts and various local and Federal agencies with land administration responsibilities is an important consideration affecting the selection of air quality control region boundaries. The designation of a region compatible with these existing regional arrangements is desirable since the implementation of a regional air pollution control effort is dependent upon cooperation at the various levels of government.

STATE AIR POLLUTION CONTROL AGENCIES

Arizona

In Arizona statewide responsibility for air pollution control lies with the Air Pollution Control Division of the State Board of Health. This division is responsible for preparing a comprehensive plan for air pollution control and encouraging political subdivisions of the State to handle local air pollution problems within their respective jurisdictions.

The Board of Supervisors of a county is authorized to designate an existing county department to carry out the necessary investigations, inspections and enforcement of regulations, or to establish a multi-county air quality control

region with one or more other counties by agreement with the Board of Supervisors of such other county or counties and contract for the joint administration of air quality control standards within the region.

Within the Study Area, only Coconino County has assumed responsibility for air pollution control county-wide. Basically the county operates prohibitively (i.e., no open burning, etc.). It has no instrumentation for scientific investigation, but can take the lead in legal actions by prosecuting violators.

The Air Pollution Control Division of the State Board of Health retains original jurisdiction and control over such air pollution matters as pertain to:

1. Any air pollution source capable of generating over 75 tons of air contaminates per day,
2. Air pollution generated by operations of agencies and departments of the State.
3. Air pollution by motor vehicles.
4. Air pollution by combustion engines, machinery and equipment to be operated in more than one county during the period of its permit.

During the fiscal year 1970 the State Department operated on a budget of $284,000, with $103,000 in State funds and $181,000 in Federal funds, employing nearly thirty people to administer the program.

During fiscal year 1971, they hope to increase their staff and operate on a budget of $395,000 with $214,000 in State funds and $181,000 in Federal funds.

Colorado

The Colorado Air Pollution Control Act of 1970 provides for a State coordinating agency responsible for all aspects of statewide air pollution control. A nine-member Commission under the State Department of Health is charged with developing and maintaining a comprehensive program for the control of air pollution. A separate air pollution control agency within the Department of Health administers and enforces the air pollution control programs adopted by the Commission.

There are 14 local (both county and municipal) programs in the State. These are presently being evaluated and reviewed for assimilation into a statewide implementation program. Only one local program, the San Juan Basin Health Unit (including Archuleta, Dolores and La Plata Counties), is located in the study area. This program, located in Durango, maintains an air monitoring and surveillance program utilizing State-furnished equipment. The State program, when completed, will make use of existing local resources such as these.

In fiscal 1969 the State spent approximately $207,000 on air pollution control activities. In fiscal 1970, the budget increased to about $239,000. The agency presently employs 12 persons and hopes to increase its staff by 10 additional persons in this fiscal year.

New Mexico

The Health and Social Services Board was established as the State Air Pollution Control Agency by enabling legislation passed in 1967. It is authorized to develop, adopt and enforce regional plans for the regulation of air pollution and to initiate cooperative action between municipalities, counties and the Board. Its jurisdiction extends to all areas of the State except those counties and/or municipalities which have provided for the local administration of air pollution regulations. No such local programs are presently operative within the study area.

The State agency now has four persons administering the program and hopes to increase its staff to twelve by the end of the year. Their budget for the fiscal year 1970 was approximately $55,600, more than double the amount expended for air pollution control activities in calendar year 1965.

Utah

Enabling legislation for Utah's Air Conservation Program passed in 1967 delegated responsibility for the administration of the Air Conservation Act, including the acceptance and administration of public and private grants, to the State Department of Health. Within the Division of Health, a nine-member committee appointed by the Governor is responsible for adopting and enforcing air pollution regulations and air quality standards. The Committee may delegate its authority to enforce regulations to local county health departments when the localities have sufficient staff and facilities to do so. All the study area counties have active local enforcement agencies which prosecute violations. Authority to grant variances, however, remains with the State.

The Air Conservation Program presently has 14 staff members and plans to increase its staff in Fiscal Year 1971. The FY 71 budget is slightly more than $200,000, approximately the same as the past fiscal year budget.

FOUR CORNERS REGIONAL COMMISSION

The Four Corners Regional Commission is a Federal-State partnership designed to spur economic growth for a 92 county region in Arizona, Colorado, New Mexico, and Utah, designated as the Four Corners Economic Development Region. The region covers 288,000 square miles and includes all of the twenty counties within the study area.

In designing a program to foster economic growth of the Region, the Commission has considered these broad categories:

Tourism and recreation
Natural resources
Transportation
Industrial development
Human resources
Education
Health

A preliminary comprehensive Regional development plan was drafted which, together with detailed public and private sector planning contracted for by the Commission, will provide guidance for the Commission's long range economic development efforts. The Commission's budget for fiscal year 1970 was $3,239,000. This will be increased to $7,390,000 in fiscal year 1971.

NORTH CENTRAL NEW MEXICO ECONOMIC DEVELOPMENT DISTRICT

The North Central New Mexico Economic Development District was created in 1967 by the Joint Powers Agreement Act to guide an eight county area in the development of a regional economic planning program and its implementation. The District's governing body is a thirty-five member Board. It is financed three-quarters by the Federal Government and one-quarter by the local governments. The counties within the study area which are included in this District are Sandoval, Rio Arriba and Los Alamos.

SUBSTATE PLANNING DISTRICTS

Three of the four States in the study area--New Mexico, Arizona and Utah--have delineated substate planning districts, while the fourth--Colorado--is in the process of such delineation (see Figure 10). Criteria for the establishment of such districts vary somewhat from state to state, but common considerations include geography, economic and social factors and development patterns.

The New Mexico planning districts were delineated in 1968, but planning for these districts continues to be primarily a function of the New Mexico State Planning Office. The study area counties are contained within three planning districts: District

FOUR CORNERS AIR QUALITY CONTROL REGION
STUDY AREA:

SUB-STATE PLANNING DISTRICTS

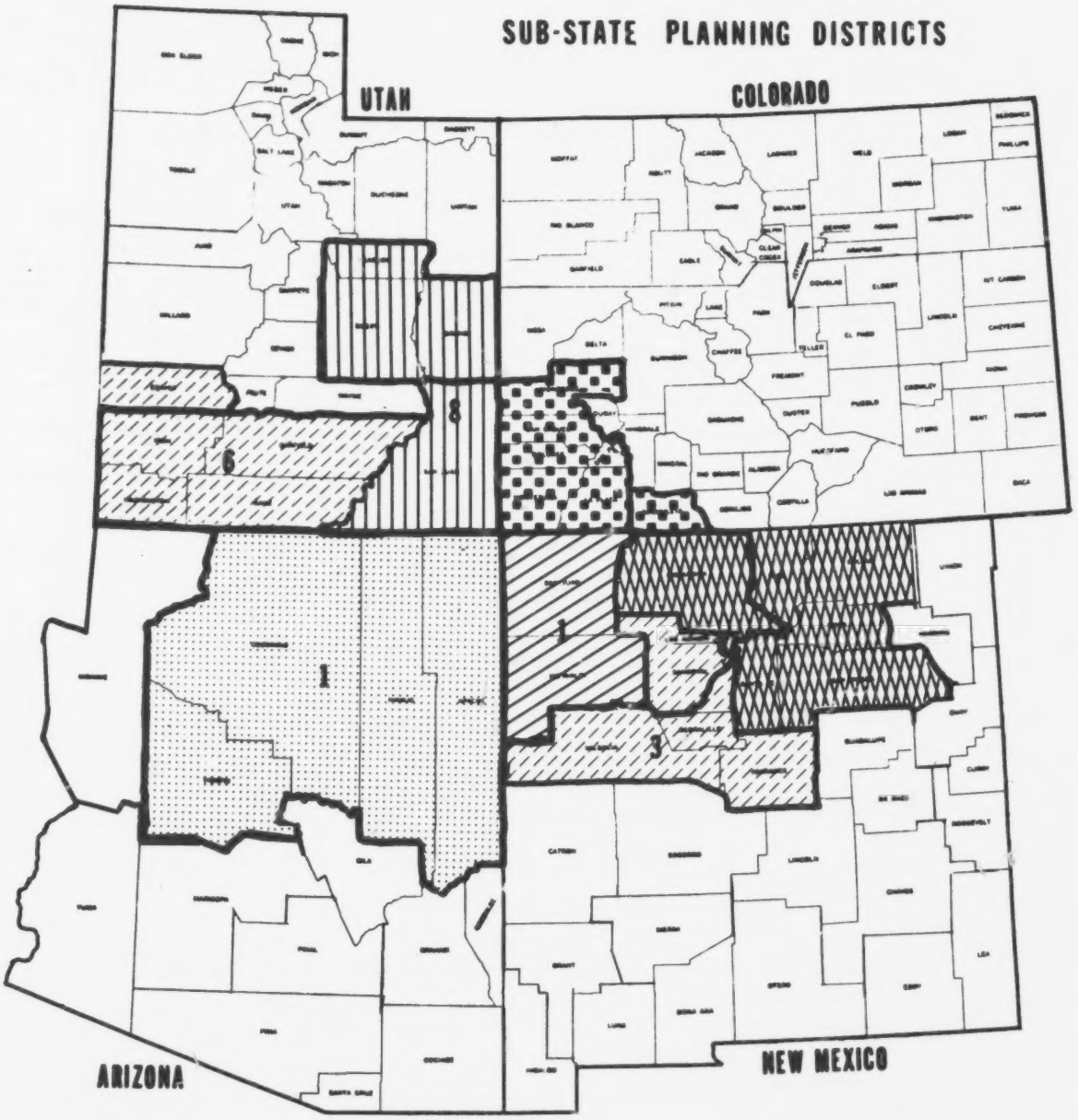

FIGURE 10

Note: Colorado sub-state district as shown is proposed.

1 (San Juan and McKinley Counties); District 2 (Rio Arriba and Los Alamos Counties in the study area and Santa Fe, Taos, Colfax, Mora and San Miguel Counties outside of the study area); and District 3 (Sandoval County part of which is in the study area and Bernalillo, Valencia and Torrance Counties outside of the study area).

In Arizona and Utah the delineation of substate districts has been a much more recent occurrence. The Arizona Department of Economic Planning and Development delineated planning and development districts earlier this year. All four of the study area counties--Coconino, Navajo, Apache and Yavapai--are included within a single district.

In May, the Governor of Utah issued an executive order officially designating substate district boundaries effective July 1. Voluntary multi-county associations of governments are suggested in the Executive Order as the vehicles through which the districts should become operative planning and development bodies. The Utah study area counties are contained primarily within the Southwestern District--District 6--consisting of Garfield, Iron, Kane and Washington Counties in the study area and Beaver County outside of the study area. One county, San Juan, is contained in the adjoining Southeastern District-District 8--consisting of San Juan, Emery, Grand, and Carbon Counties.

The State of Colorado is still in the process of determining district boundaries. While the 8 district proposal shown in Figure 10 is undergoing further revision, it is expected that the planning district dealing with the Four Corners study area --Region 6--will remain as proposed since it constitutes the San Juan River Basin with fairly defined geographical boundaries. The expected changes do include maintaining county lines as district boundaries. Region 6 would then contain all of the study area counties--Montrose, San Miguel, Dolores, San Juan, Montezuma and La Plata--plus Archuleta County.

INDIAN RESERVATIONS

Within the study area there are a number of Indian Reservations (see Figure 11). The reservations, held in trust by the United States for a particular tribe, constitute separate governmental bodies. The governing body of each tribe is the Tribal Council which has the authority to speak and act for the tribe and represent it in negotiations with Federal, State, and local governments. Among other activities, tribal governments regulate property under tribal jurisdiction.

The following is a list of tribal governing bodies within the study area by State. (There are duplications where a reservation is in more than one State.) Reservations which extend beyond the study area counties are noted.

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FOUR CORNERS AIR QUALITY CONTROL REGION STUDY AREA:

INDIAN RESERVATIONS

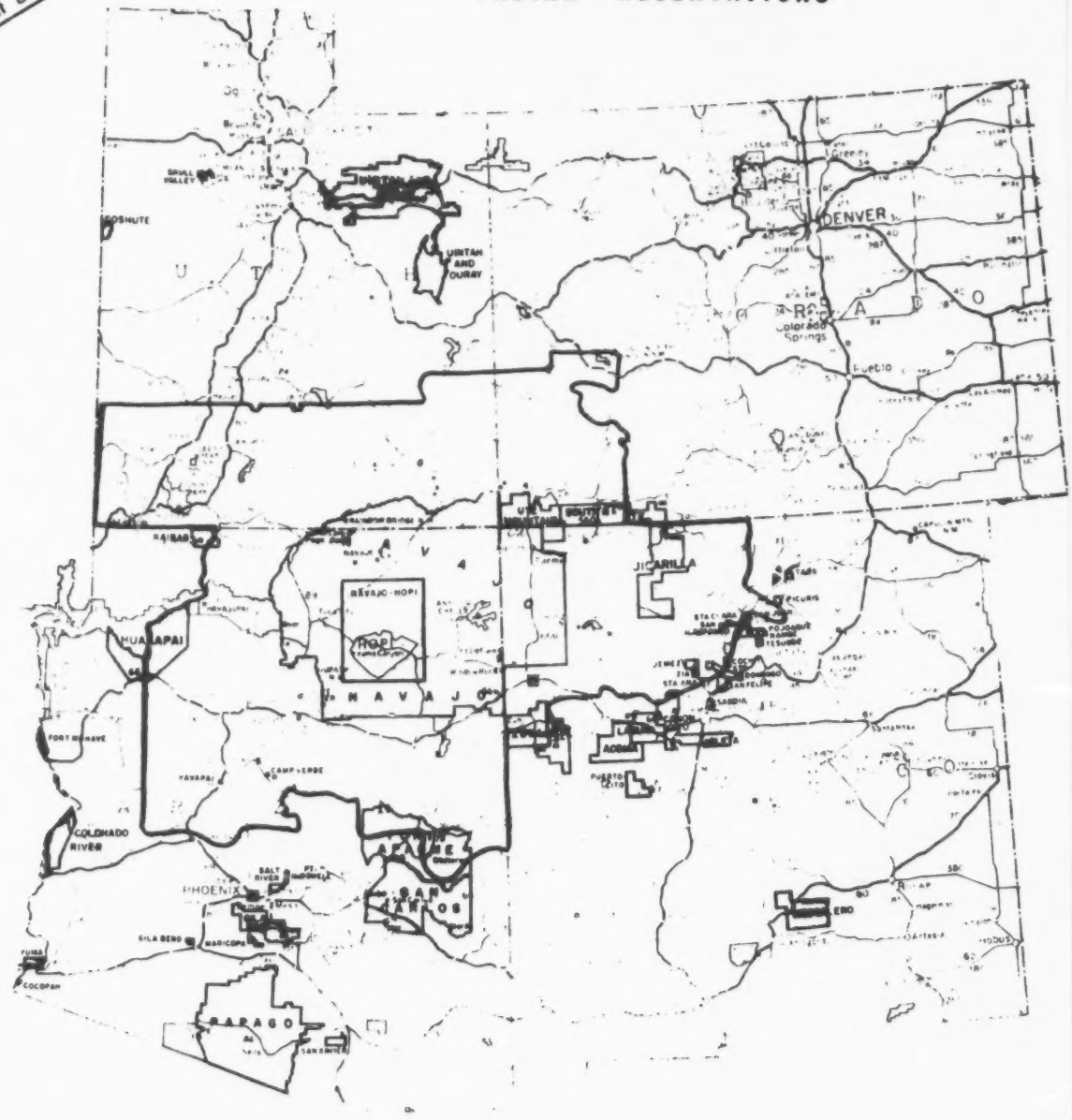

FIGURE 11

The 19 reservations contained wholly or partially within the study area encompass 26,978 square miles.

Arizona:

Navajo (Portion)
Hopi
Camp Verde
Yavapai
Kaibab (Portion)
Hualapai (Portion)
Fort Apache (Portion)

Colorado:

Ute Mountain (Portion)
Southern Ute (Portion)

New Mexico:

Navajo (Portion)
Ute Mountain (Portion)
Jicarilla Apache
Santa Clara Pueblo
San Ildefonso
Jemez Pueblo
Zia Pueblo
Canoncito (Portion)
Santa Ana Pueblo (Portion)
Santa Domingo Pueblo (Portion)
Zuni Pueblo (Portion)
San Juan Pueblo (Portion)

Utah:

Navajo (Portion)

FEDERAL AGENCIES

Introduction

A substantial proportion of land in the study area is publicly owned and managed. Data available for the four state area suggests the magnitude of Federal interest:

Percentage of Land Owned by the Federal Government

Arizona	40 to 49 percent
Colorado	30 to 39 percent
New Mexico	30 to 39 percent
Utah	over 50 percent

Thus the jurisdictional powers of the Federal agencies active in the area and the facilities for which they are responsible are a very necessary consideration in the establishment of an Air Quality Control Region. The Federal agencies active in the area are:

- Department of the Interior

  Bureau of Indian Affairs
  Bureau of Land Management
  Bureau of Reclamation
  National Park Service

- Atomic Energy Commission

- Forest Service

Four of the agencies are Bureaus under the Department of the Interior which is concerned with the management, conservation and development of the Nation's water, wildlife, mineral, forest and parks and recreation resources. As the Nation's principal conservation agency, the Department works to assure that non-renewable resources are developed and used wisely and that park and recreation resources are conserved for the future.

Executive Order Number 11507, issued by President Nixon on February 4, 1970, requires that Federal facilities provide leadership in conforming to air quality standards adopted pursuant to the Clean Air Act, as amended.

> " . . . the Federal government in the design, operation, and maintenance of its facilities shall provide leadership in the nationwide effort to protect and enhance the quality of our air . . ."

A brief discussion of the jurisdictional powers and responsibilities of each of the agencies (as they relate to air pollution control) follows.

BUREAU OF INDIAN AFFAIRS

The Bureau of Indian Affairs is the principal Federal agency working with Indian tribal organizations. The Bureau exercises a dual responsibility for the land and people comprising the 19 Reservations within the study area. Reservation lands are held in trust by the United States for the respective Indian tribes, which are considered to be the beneficial owners of the land. Actual ownership status of the land is varied. Most of the land is unallotted, i.e., held by the United States for the benefit of the Indian tribe. There may also be allotted land, i.e., land distributed by the United States to individual Indians, families, or tribes. When such is the case, the allotments contain restrictions against alienation or disposition of the land by the owner without approval by the Secretary of the Interior. As the land trustee the Bureau of Indian Affairs offers financial and technical aid for road-building and sustained yield management of forests; safeguards against misuse of mineral reserves and oversees the leasing of land for minerals development; and helps arrange commercial and industrial development of lands where feasible.

In fulfillment of its responsibility to the Indian people, the Bureau works to develop programs that will lead to Indian economic self-sufficiency, provides educational and social ser-

vices not available from other sources, and generally provides services normally provided by a local government.

There are three area offices which serve Indian Reservations in the study area. These are located in Albuquerque, New Mexico; Gallup, New Mexico; and Phoenix, Arizona. Within the jurisdiction of each area office are field offices called "agencies" which are more directly responsible to the tribal governments they serve and whose basic function is to plan for the various programs funded by Congress.

The agency planning input is compiled by the area office into a report submitted to the central office for budgetary review. The following is a list of the three area offices and their agencies (or field offices) which serve the tribal governments within the study area.

Albuquerque

Southern Ute - Ignacio, Colorado
Ute Mountain - Tawaoc, Colorado
Jicarilla - Dulce, New Mexico
N. Pueblo - Santa Fe, New Mexico
S. Pueblo - Albuquerque, New Mexico
Zuni - Zuni, New Mexico

Navajo

Intermountain School - Brigham City, Utah
Chinle - Gallup, New Mexico
E. Navajo - Gallup, New Mexico
Ft. Defiance - Ft. Defiance, Arizona

Shiprock Agency - Shiprock, New Mexico
Tuba City Agency - Tuba City, Arizona

Phoenix

Ft. Apache Agency - White River, Arizona
Hopi Agency - Keams Canyon, Arizona
Phoenix School - Phoenix, Arizona

BUREAU OF LAND MANAGEMENT

The Bureau of Land Management manages and disposes of public lands and their related resources in eleven Western states. The land managed by the Bureau consists of public lands remaining after the selection of lands under settlement laws and the establishment of National Parks, Forests Indian Reservations, etc. The Bureau's responsibilities include the following:

1. Acting on applications and claims for the use of or title to public lands (i.e., issuance of grazing permits).

2. Administration of mineral resources through the leasing of minerals on public lands and on lands in other ownership on which the mineral rights are Federally owned.

3. Forest management on timber lands under its jurisdiction to obtain continuous timber production at the highest possible level, and promote the economic stability of dependent communities.

4. Carrying out a program for the conservation, development and utilization of water resources.

5. Selling or leasing suitable public land to State and local governments for recreational purposes.

6. Participating with Federal, State and local agencies in the management of recreation and wildlife resources.

In carrying out these responsibilities, the Bureau is continually evaluating and classifying the lands managed for their best use.

In light of the rising population and the demand for heavier use of the public land, management is being intensified for greater yield of all values, including recreation, wildlife, and beauty, as well as the more traditional purposes of grazing, mining, and mineral leasing. Particularly important from an air quality control point of view are the Bureau's activities in identifying and preserving the recreational and scenic value of public lands. Illustrative of the Bureau's power and responsibility with respect to the environment is its ability to impose air quality standards through conditions attached to the lease or sale of its land for a purpose which might generate air pollution (i.e., mining or smelting operations, power plants, etc.).

Each state has a central office located in the State capital and number of small district offices dispersed throughout the state. The district offices with jurisdiction in the study area are as follows:

UTAH

1. Monticello District Office
   Monticello, San Juan County, Utah

2. Kanab District Office
   Kanab, Kane County, Utah

3. Cedar City District Office
   Cedar City, Iron County, Utah

NEW MEXICO

1. Albuquerque District Office
   Albuquerque, Bernalillo County, New Mexico

ARIZONA

1. Arizona Strip District
   St. George, Utah

2. Phoenix District
   Phoenix, Arizona

3. Stafford District
   Stafford, Arizona

COLORADO

1. Montrose District Office
   Montrose, Montrose County, Colorado

   a. Durango Sub-Office
      Durango, La Plata County, Colorado

BUREAU OF RECLAMATION

The Bureau of Reclamation is authorized to develop and operate works for the storage, diversion and development of

waters for the reclamation of arid and semi-arid lands in 17 western states and Hawaii. Within the study area there are six reclamation projects in operation: the Mancos, Pine River, Florida, Hammond, and Uncompahgre Projects and the Glen Canyon Dam Unit of the Colorado River Storage Project. Another six projects are either under construction or authorized for construction. These include: the San Miguel, Dallas Creek, Animas-La Plata, San Juan-Chama and Navajo Indian Irrigation Projects and the Navajo Unit of the Colorado River Storage Project.

The Bureau's program is designed to stabilize and promote the growth of local and regional economies through optimum development of water and related land resources. Multipurpose uses of reclamation projects which serve to directly stimulate local economy are irrigation water service, municipal and industrial water supply and hydroelectric power generation and transmission. Two of the twelve projects in the study area provide for hydroelectric power generation--the Uncompahgre Project and the Glen Canyon Dam Unit of the Colorado River Storage Project.

Projects are also developed for water quality improvement, fish and wildlife enhancement, and outdoor recreation. Reservoirs developed in conjunction with the National Park Service and used for recreational purposes provide for a wide range of activities

and facilities such as camping, swimming, boating, hunting and fishing. Land is also available for lease for cabin and club-house sites. Enjoyment of these facilities is predicated on the maintenance of a high quality environment in the region.

Portions of the study area fall within three designated regions of the Bureau of Reclamation and thereby come under the jurisdiction of three separate regional offices. These offices are located at Boulder City, Nevada; Salt Lake City, Utah; and Amarillo, Texas. In connection with providing water related services in this area, the Secretary of the Department of Interior is responsible for seeing that private companies who benefit from such services meet legislated standards for environmental control. The Bureau is presently involved in negotiations to require removal of particulates from stack emissions of the Four Corners Plant and the proposed San Juan Plant.

NATIONAL PARK SERVICE

Within the study area, the Park Service has responsibility for administering six National Parks (1,959.7 square miles), 17 National Monuments (648.9 square miles), and one Recreation Area (1,853.8 square miles). The study area falls entirely within the jurisdiction of the Southwest Regional Headquarters, located in Santa Fe, New Mexico. A more thorough discussion of the impact

of the National Park Service and those lands it administers on the study area is contained in the "Natural and Recreation Attractions" section of this report.

The fundamental objective of the National Park Service is to promote and regulate the use of national parks, monuments, and similar land reservations in order to "conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." Its protection program consists not only of preventing fires, stream pollution, and injury to natural, historic or prehistoric features, but also of restricting uses that are incompatible with the basic purposes of the parks.

ATOMIC ENERGY COMMISSION

The Atomic Energy Commission (AEC) is responsible for the licensing and regulation of civilian use of nuclear materials. This responsibility places the several uranium mines and uranium ore processing plants in and around the study area within the jurisdiction of the Commission. As a part of the licensing procedure AEC sets standards for radiation emission. Under a formal agreement with the Commission, Colorado and Arizona have assumed responsibility for the monitoring and enforcement of radiation

emission standards; New Mexico and Utah have not. The standards enforced by the states are essentially those of the AEC because states are required to meet AEC standards in order to enter into such an agreement.

FOREST SERVICE

The U.S. Department of Agriculture's Forest Service administers 154 national forests, 12 of which are wholly or partially within the study area. These twelve Forests encompass approximately 26,847 square miles. Another 113 square miles are in the process of being acquired as additions to the National Forest lands.

Nationwide over 40 percent of forest land is within areas now experiencing economic distress. Proper management development, and utilization of these lands are important factors in permanent improvement of local economies. Forest service lands are managed under the guiding principles of the Multiple-Use Sustained Yield Act passed by Congress in 1960 which directs that the lands be developed and administered for their several basic products and services, i.e., outdoor recreation, range, timber, watershed, wildlife and fish. Under the multiple-use principle most areas are used for, or serve more than one purpose. The Forest Service also cooperates with State agencies and private owners to improve management of non-Federal forest lands.

The Forest Service maintains nine regional offices. The study area falls within three separate regions (Rocky Mountain Region, Intermountain Region and Southwestern Region) and is therefore administered under three separate regional offices. These are located in Denver, Colorado; Albuquerque, New Mexico; and Ogden, Utah.

VII AIR QUALITY AND EMISSION DATA

AIR QUALITY DATA

Sampling data in the Four Corners study area is limited because of the generally rural environment of this vast area. A total of twenty-three stations were noted as sampling suspended particulates in the area with the following breakdown: Arizona (2), Colorado (15), New Mexico (5), and Utah (1). Additional particulate studies may have been conducted in the past or is currently underway in the area. Also, three stations of the National Air Pollution Control Administration's Interstate Effects Surveillance Network exist in New Mexico. The total number of sampling stations is somewhat deceiving, however, as ten are located in one county (Mesa, Colorado). Suspended particulate data is shown in Table XV. In addition to the stations summarized in Table XV, sampling stations exist in Page (Coconino County), Arizona; two additional stations in Durango (La Plata County), Colorado; seven additional stations in Grand Junction (Mesa County), Colorado; and in Farmington, Shiprock, Aztec, and Los Alamos, New Mexico. Sampling stations have also been set up around several of the new steam-electric power plants that are under construction.

The geometric mean values on an annual basis averaged from a low of 12 micrograms per cubic meter ($ug/m.^3$) at Mesa Verde National

TABLE XV

AIR QUALITY DATA [1]

Suspended Particulates ($\mu g/m^3$)

Site & Year	No. of Samples	Minimum	Fiftieth Percentile	Maximum	Geometric Mean
Grand Canyon [2] National Park, Conconino, Co. Ariz.					
1959	24	2	21	53	17
1960	21	2	17	79	20
1961	25	2	16	60	15
1962	26	3	14	52	14
1963	27	3	20	67	16
1964	25	6	18	95	19
1965	24	7	18	44	19
1966	25	3	32	98	27
1967	25	3	16	106	17
1968	25	5	16	126	21
1959-1968	247	2	19	126	18
Durango [3] La Plato Co, Colo.					
1965	99	12	75	214	78
1966	113	22	91	282	88
1967	112	24	69	250	70
1968	80	22	73	260	79
1965-1968	404	12	76	282	70
Grand Junction [4] Mesa Co., Colo.					
1964	110	26	69	535	72
1965	88	18	75	203	73
1966	91	23	78	251	78
1967	82	20	65	230	64
1968	95	18	84	240	80
1964-1968	466	18	75	535	73

TABLE XV
(Cont'd)

Site & Year	No. of Samples	Minimum	Fiftieth Percentile	Maximum	Geometric Mean
Mesa Verde National Park 2/ Montezuma Co. Colo.					
1958	26	4	15	33	12
1959	22	4	12	80	15
1960	24	2	11	53	11
1961	25	1	9	25	9
1962	25	1	16	52	12
1963	25	1	14	70	15
1964	26	1	11	52	12
1965	23	1	11	57	9
1966	25	3	16	75	14
1967	24	2	14	92	15
1968	21	4	11	50	11
1958-1968	266	1	12	92	12
Montrose, 3/ Montrose Co., Colo.					
1967	106	25	87	459	85
1968	92	26	98	300	93
1967-1968	198	25	89	459	89
Rio Arriba Co. New Mexico					
1964	26	9	23	257	28
1965	25	8	18	75	21
1966	24	10	23	54	23
1967	23	8	20	144	23
1964-1967	98	8	21	257	24
Bryce Canyon 2/ National Park Gardield Co, Utah					
1958	23	4	20	403	32
1959	24	8	25	144	29
1958-1959	47	4	25	403	30

1/ National Air Surveillance Network
2/ Support by National Park Service
3/ Support by Colorado State Health Department
4/ Support by Mesa County Health Dept.

Park to a high of 89 ug/m.^{3} in Montrose, Colorado. Maximum daily values ranged to a high of 535 ug/m.^{3} in Grand Junction, Colorado. It is interesting to note that several of the "rural" stations have shown significant increases in maximum values in recent years. For example, Table XV shows that the sampling site at Grand Canyon National Park, Arizona, has witnessed the annual maximum values increase from 61 ug/m.^{3} in the 1959-1962 period to 110 ug/m.^{3} in the 1966-1968 period. The contrast between minimum and maximum values at this and other "rural" sites is quite interesting and points out the fact that air pollution does exist above the background concentrations. The only urban stations for which data is shown were in Durango, Montrose and Grand Junction, Colorado.

Table XVI gives the monthly dustfall data in grams per square meter per month for the three New Mexico sampling sites of the Interstate Effects Surveillance Network. Although all sites were below the fiftieth percentile level on a nationwide basis, dustfall levels are increasing at both the Shiprock and Farmington sites. The Dulce (Rio Arriba County) site is primarily a climatic control station. Comparison of other pollutant indicators at the Dulce and Farmington sites with similar stations on a nationwide basis (270 sampling sites) showed the following percentile rankings for 1968 values:

Dulce: Particulates - lower than 25% of all other sites.
Sulfur oxides - lower than 25% of all other sites.
Hydrogen sulfide - lower than 25% of all other sites.
Acid aerosols - between 25 and 50% of all other sites.
Oxidation potential - between 75 and 90% of all other sites.

TABLE XVI

Dustfall[1/] (g/m^2/month)

Period Observed	IESN 50th Percentile in 1968	Farmington, N. Mex. (San Juan Co.)		Shiprock, N. Mex. (San Juan Co.)		Dulce, N. Mex. (Rio Arriba Co.)
		1968	1969	1968	1969	1968
January	4.0	2.9	2.8	1.4	1.2	1.3
February	3.5	2.2	2.0	2.2	0.9	1.3
March	5.7	4.2	1.9	2.4	2.7	2.5
April	5.5	2.8	2.2	-	0.9	2.3
May	4.9	2.1	2.9	-	1.5	1.3
June	4.8	1.4	7.3	2.3	-	1.2
July	4.5	-	-	2.0	5.4	4.1
August	4.2	1.6	10.3	2.2	1.7	3.8
September	4.0	1.8	4.3	3.8	3.0	1.4
October	4.1	2.5	3.7	2.1	5.3	1.7
November	4.2	2.4	1.9	-	2.0	0.6
December	3.8	1.3	1.7	1.1	-	-
Jan - Dec. Average	4.4	2.3	3.7	2.2	2.5	2.0

1/ Interstate Effects Surveillance Network

Farmington: Particulates - between 25 and 50% of all other sites.
Sulfur oxides - between 25 and 50% of all other sites.
Hydrogen sulfide - lower than 25% of all other sites.
Acid aerosols - between 25 and 50% of all other sites.
Oxides of nitrogen - lower than 25% of all sites.
Static samplers of the oxidation potential - between 75 and 90% of all sites.

The above data, also compiled from the Interstate Effects Surveillance Network, shows that while actual levels of particulates and sulfur oxides are below 75% of all other sites, the oxidation or "smog" potential of both stations is greater than 75% of all of the other 270 sampling sites throughout the Nation.

AIR POLLUTANT EMISSION DATA

As is the case with air monitoring data, emission data on the study area is very scarce and usually consists of a particular calculation for an individual point source. The State of New Mexico has made a "rapid survey" of air pollutant emissions for the counties of McKinley, Rio Arriba, and San Juan. Various estimates have been made of the emissions from the existing and proposed steam-electric power plants within the Region. For example, the first three units of the Four Corners Plant has been estimated as capable of emitting 250 tons/day of flyash without air pollution controls, and 33 tons/day under "best control."[10/] Units 4 and 5 would increase this emission under "best control" to 128 tons/day. It is interesting to note the suspended particulate emissions on a summer day in

10/ Statement by John Bartlitt before the New Mexico Public Service Commission, November 1969.

New York City average 140 tons/day for the entire city.

Particulate emissions from the Navajo Plant, currently under construction near Page, Arizona, are estimated to be 10 ug/m.^{3} . Sulfur dioxide emissions are estimated at 117 tons/day, with the sulfur content being quite low for coal used in this plant. However, the size of the Navajo plant (2310 mw) and the possible location of another plant (Kaiparowitz, 5-6000 mw) only ten miles distant along Lake Powell, makes the mass-rate of sulfur dioxide emissions rather than the percent sulfur content of the coal the most important consideration. Furthermore, air pollutant emissions from two such power plants would affect an area of scenic recreational value no matter which direction the wind blows at any particular time. Informed citizens groups have obtained the advice of experts and demand control efficiencies that are 99% and above, to protect the environment in these areas.

Exact emission totals, the degree of control efficiencies, and other factors relating to the potential air pollutant emission problem in the Four Corners area are not yet available. However, the previous discussion of the coal resources and the number of large power plants that exist, are under construction or are planned, make it quite evident that extreme precautions should be taken in controlling the effects of air pollution in the area. Particulate meteorological conditions have been noted to carry suspended

particulate emissions from the Four Corners plant some 100 to 150 miles in distance. A northwest wind directs pollutants through the Rio Chama Valley and possibly into the Rio Grande air shed. Haziness from this plant and its plume often interferes with the full enjoyment of the many historic sites, national parks and monuments, and other recreational areas in the vicinity.

LOCATION OF POTENTIAL POINT SOURCES

Table XVII lists the potential point sources of air pollution by county and type. It is quite obvious that the major point sources in the Region are the existing and proposed steam-electric power plants. Two areas of concentration of power plants are located, one around Farmington, New Mexico, and the other in the Glen Canyon Dam area of northern Coconino County, Arizona. Other point sources are generally concentrated about corresponding population centers such as the Grand Junction, Colorado, and Grants, New Mexico areas. The point sources listed in Table XVI are not necessarily uncontrolled with regard to air pollutant emissions, and the list does not include all small and intermittent sources whose cumulative effect may be significant.

TABLE XVII

POTENTIAL POINT SOURCES BY COUNTY

ARIZONA

Coconino

Steam-electric power plant (Page), Navajo Plant (under construction) - first unit operations, 1974. Total capacity - 2,310,000 kw.

Navajo

Steam-electric power plant (Joseph City), Cholla Plant - 115,000 kw.
Kraft pulp mill (Snowflake) - 320 tons/day

Yavapai

Cement plant (Clarkdale) - 2,600,000 barrels/year
Sulfuric acid plant (Bagdad) - 72,000 tons/year

COLORADO

Delta

Grain elevator

Dolores

Grain elevators (6)

La Plata

Steam-electric power plant (Durango), Durango plant - 5,000 kw.
Grain elevators (2)
Flour mill

Mesa

Steam-electric power plant (Grand Junction), Grand Junction plant - 17,000 kw.
Steam-electric power plant (Cameo), Cameo plant - 75,000 kw.
Rendering plants (Grand Junction (2)
Oil Refinery (Grand Junction) - 5,400 barrels/year
Iron Foundry (Grand Junction)
Flour mill
Grain elevator
Coal Cleaning plant - 60,000 tons/year
Uranium ore processing plant (Grand Junction) - 500 tons/day

TABLE XVII (Continued)

Montezuma

Grain elevators (5)
Flour mill

Montrose

Steam-electric power plant (Montrose), Jim Bullock plant - 10,000 kw.
Sulfuric acid plant (Uravan) - 55,000 tons/year
Uranium ore processing plant (Uravan) - 1,500 tons/day

NEW MEXICO

McKinley

Steam-electric power plant (Gallup), Gamerco plant - 16,000 kw.
Oil refinery (Ciniza) 14,000 barrels/day
Coal cleaning plant - 231,000 tons/year

San Juan

Steam-electric power plant (Southwest of Farmington), Four Corners plant. Units 1, 2, 3 - 575,000 kw.
Units 4, 5 (under construction) - 1,550,000 kw.
Units 6,7, 8 (proposed) - 2,400,000 kw.
Total plant capacity contemplated of 4,525,000 kw.
Steam-electric power plant (West of Farmington), San Juan plant. operating 1974. Capacity - 330,000 kw.
Steam-electric power plant (Farmington), Animas plant - 36,000 kw.
Soap and detergent plant (Farmington)

Valencia

Sulfuric acid plant (Grants) - 140,000 tons/year
Uranium ore processing plant (Grants) - 6,000 tons/day
Uranium ore processing plant (Grants) - 3,500 tons/day
Uranium ore processing plant (Bluewater) - 3,000 tons/day
Flour mill

Emery

Steam-electric power plant (Huntington Canyon, 30 miles south of Price), proposed capacity - 430,000 kw.
Coal cleaning plant - 30,000 tons/year

TABLE XVII, (Continued)

Grand

Uranium ore processing plant (Moab) - 1,500 tons/day

Iron

Steam-electric power plant (Cedar City), Cedar City plant - 7,500 kw.
Rendering plant (Cedar City)
Grain elevator

Kane

Steam-electric power plant (Proposed alternate sites under consideration at Warm Creek and Sit Down Bench), Kaiparowitz plant. Ultimate capacity - 5-6,000,000 kw.

San Juan

Sulfuric acid plant (Mexican Hat) - 27,600 tons/year
Flour mill

Washington

Grain elevator

VIII - THE PROPOSED REGION

Subject to the scheduled consultation, the Secretary, Department of Health, Education, and Welfare, proposed to designate an air quality control region for the Four Corners area, consisting of the following jurisdictions or parts thereof:

In the State of Arizona:

Apache County
Conconino County
Navajo County
Yavapai County

In the State of Colorado:

Archuleta County
Delta County
Dolores County
La Plata County
Mesa County
Montezuma County
Montrose County
San Juan County
San Miguel County

In the State of New Mexico:

Portion of McKinley County lying west (Pacific Slope) of the Continental Divide
Portion of Rio Arriba County lying West (Pacific Slope) of the Continental Divide
Portion of Sandoval County lying West (Pacific Slope) of the Continental Divide
San Juan County

In the State of Utah:

Emery County
Garfield County
Grand County
Iron County

In the State of Utah: (Continued)

Kane County
San Juan County
Washington County
Wayne County

As proposed, the Four Corners Interstate Air Quality Control Region would consist of the territorial area encompassed by the outermost boundaries of the above jurisdictions and the territorial area of all municipalities located therein and as defined in Section 302(f) of the Clean Air Act, as amended, (42 U.S.C. 1857h(f)).

The boundaries of the proposed Region are indicated by the heavy line on the map in Figure 12. Table XVIII gives the 1970 population and area of the various jurisdictions in the proposed Region.

As shown in Table XVIII, the total population in the proposed Four Corners Interstate Air Quality Control Region is 433,625. The Region as proposed covers approximately 108,000 square miles with the resultant population density of only four persons per square mile. At the time of this proposal, the Four Corners Region is the largest in area of any air quality control region yet proposed in the Nation.

FIGURE 12. PROPOSED FOUR CORNERS INTERSTATE AIR QUALITY CONTROL REGION

TABLE XVIII

POPULATION AND AREA OF PROPOSED FOUR CORNERS
INTERSTATE AIR QUALITY CONTROL REGION

STATE AND COUNTY	1970 POPULATION	AREA (Square Miles)
ARIZONA		
Apache	32,237	11,171
Conconino	47,355	18,562
Navajo	45,941	9,910
Yavapai	35,869	8,091
Sub-total	161,402	47,734
COLORADO		
Archuleta	2,581	1,364
Delta	14,868	1,154
Delores	1,550	1,026
La Plata	18,977	1,684
Mesa	52,598	3,303
Montezuma	12,604	2,094
Montrose	17,876	2,238
Jan Juan	811	391
San Miguel	1,763	1,283
Sub-total	123,628	14,537
NEW MEXICO		
McKinley (portion)	41,000*	4,130*
Rio Arriba (portion)	2,000*	2,110*
Sandoval (portion)	100*	400*
San Juan	51,917	5,506
Sub-total	95,017	12,146
UTAH		
Emery	5,104	4,439
Garfield	3,076	5,185
Grand	6,572	3,697
Iron	11,982	3,300
Kane	2,318	4,016
San Juan	9,479	7,799
Washington	13,703	2,427
Wayne	1,344	2,486
Sub-total	53,578	33,349
TOTAL FOR AQCR	433,625	107,766

* Estimated

DISCUSSION OF THE PROPOSAL

The Four Corners Air Quality Control Region boundaries should:

1. Encompass an area which can be defined as a geographical unit.
2. Include major existing and potential sources of pollution generation.
3. Include major scenic and recreation and areas.
4. Be reasonably compatible with existing governmental jurisdictions.

The following is an analysis of the impact of the various factors covered by this report with respect to the establishment of suitable boundaries.

TOPOGRAPHY

Any strong case for the delineation of boundaries on the basis of topography is difficult, for there are a number of interconnecting geographic subareas within the region. In Colorado, a substantial rise in elevation along the Uncompahgre Plateau is a natural boundary which would exclude the eastern portion of Montrose County. The addition of Archuleta County would serve to include all the land cradled by the San Juan Mountains and be more consistent with the New Mexico boundary.

In New Mexico changes in elevation do not provide so distinct a boundary as they do in Colorado. The study area might be

logically extended as far east as the Sangre de Cristo Mountains to include Taos County and the northern portion of Santa Fe County, or it might be reduced to extend no further than the periphery of the Colorado Plateau, excluding portions of Rio Arriba and Sandoval Counties and all of Los Alamos. The selection of the Continental Divide as the eastern boundary in New Mexico represents the latter alternative. To the south there is no distinct physical boundary.

In Arizona, there are no real topographical ties between Yavapai County and the other counties included in the study area. The Colorado and Coconino Plateaus are the predominant geographical features, cut by the Mogollon Rim running northwest to southeast. Yavapai County was included for other reasons discussed later.

In Utah the Wasatch Range running north-south bisects the study area counties. Peaks in the Wasatch Range reach heights above 11,000 feet and are quite a clear physical demarcation. Because of this natural air shed, it was geographically logical to extend the proposed northern boundary in Utah along the basin of the Colorado River, including Wayne, Emery, and Grand Counties. Iron and Washington Counties, located west of the Wasatch Range, are not related in a topographical sense to the remainder of the Region's proposed boundaries. They were included in the propo als for other reasons described later.

EXISTING AND POTENTIAL POLLUTION SOURCES

The major existing and potential pollution sources were included in the study area with the exception of several sources in the Grand Junction, Colorado area. However, two thermal-electric plant sites are located outside the study area and thus give added support to the addition of two counties to the Region: (1) the Huntington Plant in Emery County, Utah; (2) the possibility of a power plant in Delta County, Colorado.

The controlling factors in power plant development are the availability of coal and cooling water. Inclusion of two tiers of counties running northward from the study area (Emery and Grand Counties in Utah and Mesa and Delta Counties in Colorado) encompassed the most potential sites for the development of power plants. The coal resources in eastern Utah and western Colorado are located in an area to the north of these counties which is geographically distinct from the Four Corners area and not suitable for inclusion in the Region.

Uranium mines and mills, as sources of radioactive emissions and dust, should be located within the region where possible. This consideration supported adding Grand County, Utah, and Mesa County, Colorado to the Region. Though not included in the proposed boundaries, Valencia County, New Mexico should be given consideration on this same basis.

SCENIC AND RECREATION ATTRACTIONS

The study area as presently defined, includes most of the scenic and recreation attractions of the area. Two attractions that could be added are the Arches National Monument in Grand County, Utah, and the northern portion of the Capitol Reef National Monument in Wayne County, Utah. Support for including Washington County Utah (Zion National Park) and Iron County, Utah (Cedar Breaks National Monument) is also significant from this consideration. Yavapai County, Arizona, also contains several national monuments and derives support from this factor.

GOVERNMENTAL JURISDICTIONS

The jurisdictions most important to consider are the substate district boundaries and Indian Reservations. It would also be desirable to minimize the division of other jurisdictions.

Adjustment of the air quality control district boundary to conform to substate district boundaries is not feasible in all the States (see Figure 10).

The State of Arizona places highest priority upon substate planning regions and has expressed its desire that all future air quality control regions affecting the State conform to these planning regions. The four counties proposed in Arizona are coterminous with Planning Region No 3 and this administrative factor is the key support for the addition of Yavapai County to the proposed boundaries.

In Colorado the addition of Archuleta County would complete the inclusion of all counties in substate Planning Region No. 6.

The addition of Emery and Grand Counties in substate District 8 would be compatible with substate planning regions, and it would be illogical to exclude Wayne County with Emery and Grand Counties included.

In New Mexico there appears to be no satisfactory way to reconcile the boundaries.

As can be seen on Figure 11, the selected study area splits several Indian reservations. This is resolved in Colorado by adding Archuleta County (Southern Ute Reservation). The southern portion of the Fort Apache Reservation in Arizona is already included in the recommended Arizona-New Mexico Southern Border Interstate Air Quality Control Region.

RELATIONSHIP TO SURROUNDING AIR QUALITY CONTROL REGIONS

A restriction in selecting the proposed boundaries for the Four Corners region was the relationship to surrounding air quality control regions. This was particularly true along the southern and western boundaries of the proposal. The southern boundary of the Region was limited by two adjacent air quality control regions - the designated Phoenix-Tucson Intrastate Air Quality Control Region and the recommended Arizona-New Mexico Southern Border Interstate Air Quality Control Region. The western boundary in Arizona was likewise set by the designated Clark-Mohave Interstate Air Quality Control Region. Other air quality control regions in the immediate vicinity include the recommended designated Wasatch Front Intrastate Air Quality Control Region in the Salt Lake Valley of Utah.

CONCLUSIONS

Based on the above discussion and data presented within the report, the proposed boundaries for the Four Corners Interstate Air Quality Control represents a logically contiguous arrangement of State and local jurisdictions necessary for maintaining a successful air pollution control program. Although the present air pollution problems of the Region consist of the individual point source variety, proposed changes in the character of the area such as new power plants, industrial expansions, and increased visitations by tourists taking advantage of the tremendous recreational potential of the area require steps be taken immediately to protect and enhance the Region's environmental quality. Establishment of an air quality control region should initiate such activities and set the protective goals on a specific timetable.

Following careful review of all suggestions and opinions submitted for the record by interested parties, the Secretary of Health, Education, and Welfare makes a formal designation of the region boundaries and notifies the Governors of the designation.